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SIMPLY BETTER

ProCon Streamline Hybrid Unit.

Installation and Operating Manual.

Unit 4 Epsom Downs Metro Centre, Waterfield, Tadworth, Surrey, KT20 5LR
Telephone 08456 448802 Fax 08456 448803 Email info@mhgheating.co.uk Web DHWw.mhgheating.co.uk
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1.0 Appliance Type

The ProCon Streamline Hybrid unit is supplied complete with a 3-10kW air to water heat pump (COP 4.4), 7.7-26.8kW modulating condensing gas boiler and comprehensive controller.

The heat pump module is designed as a split system.

A suitably qualified F gas registered engineer is required to install and commission the interconnecting refrigerant pipework.

The external unit is supplied with 3.2kg of R410A refrigerant which is sufficient for 10m (One way) of interconnecting refrigerant pipework. (Model PUHZ-SW75VHA.UK)

The modulating gas condensing boiler can operate on either Natural Gas or LPG. (Conversion kit required).

Kit Name	Product Code
Natural Gas	18.60000-9300
LPG conversion kit	96.34344-7207
External Unit	PUHZ-SW75VHA.UK

2.0 Installation Regulations and Requirements

The installation of the Hybrid unit must be in accordance with the relevant requirements of Gas Safety (Installation & Use) Regulations 1994, Health & Safety at Work Act, Building Regulations, IEE Regulations, Construction (Design & Management) Regulations 1994, Local Authority Bye-Laws, National, Fire Regulations and Insurance Company requirements.

The following Codes of Practice are also applicable:-

F Gas and ODS Regulations.

BS 5440-1: 2008 Installation of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases).
Part 1: Specification for the installation of flues.

BS 5440-2: 2009 Installation of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases).
Part 2: Specification for installation and maintenance of ventilation for gas appliances.

BS 5449: 1990 Specification for forced circulation hot water central heating systems for domestic premises.

BS 6644: 2011 Specification for gas fired hot water boilers of rated inputs between 70kW (net) and 1.8MW(net) (2nd and 3rd family gases).

BS 6798: 1987 Specification for installation of gas fired hot water boilers of rated input not exceeding 60 kW.

BS 6880: 1988 Code of Practice for low temperature hot water heating systems of output greater than 45kW. Parts 1, 2 & 3.

BS 6891: 1988 Specification for installation of low pressure gas pipework of up to 28mm (R1) in domestic premises (2nd family gases)

BS 7593: 1992 Code of Practice for treatment of water in domestic hot water central heating systems.

BS 7671: 1992 Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition.

CISBE Guide reference sections B7, B11 and B13.

CP342 Part 2: 1974 Code of Practice for centralized hot water supply.

IGE/UP/2 Gas installation pipework, boosters and compressors on industrial and commercial premises.

IGE/UP/4 Commissioning of gas fired plant on industrial and commercial premises

IGE/UP/10 Installation of gas appliances in industrial and commercial premises. Part 1: Flued appliances.

And any addition prevailing regulation and or code of practice not detailed above.

3.0 Appliance Warranties

All MHG appliances enjoy a full 36 month warranty as detailed in our terms and conditions.

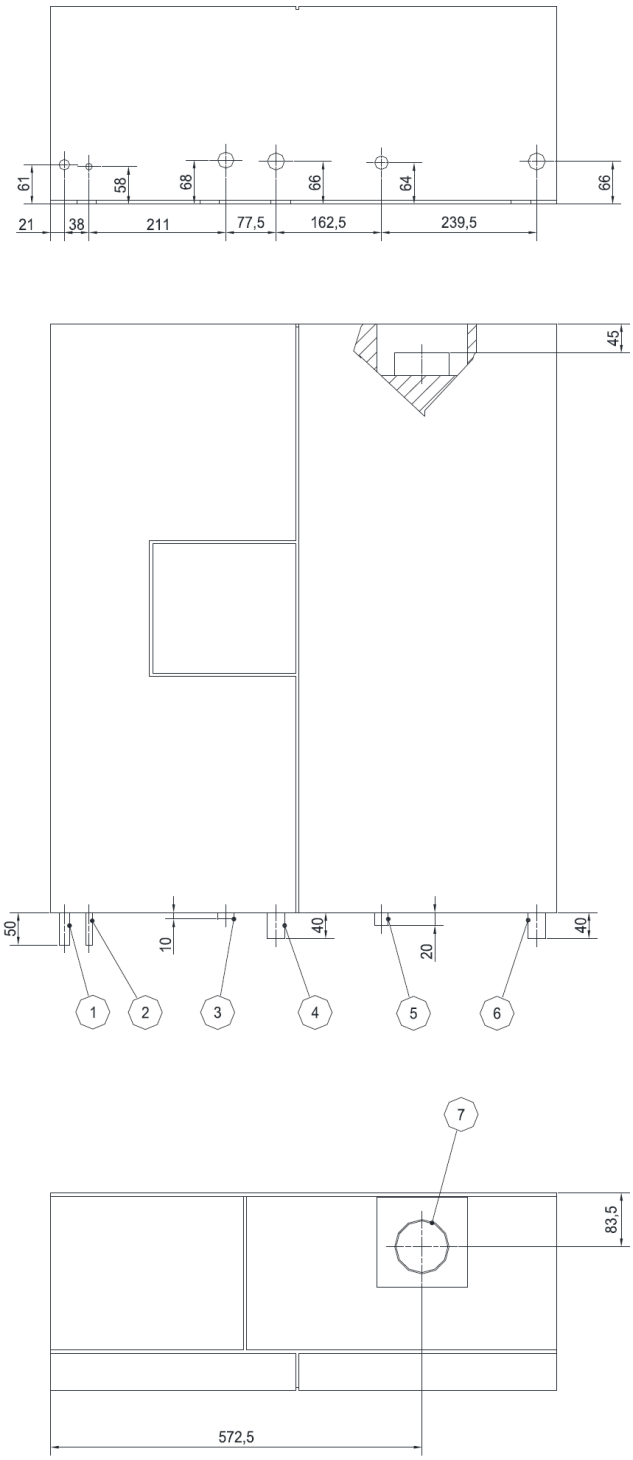
The guarantee period shall begin on the day of commissioning, or at latest 3 months after delivery has been made.

The customer shall only be able to claim against MHG under guarantee if the commissioning of the object of delivery has been carried out by MHG staff or the authorized supplier, if the customer has followed MHG's instructions relating to the treatment and maintenance of the object of delivery and if no replacement parts of outside origin have been fitted.

Parts subject to wear such as ignition electrodes, seals etc. are strictly excluded from the guarantee.

In addition to the above warranties, the gas condensing boilers Primary Heat Exchangers carry a 60 month guarantee against manufacturing or material defect.

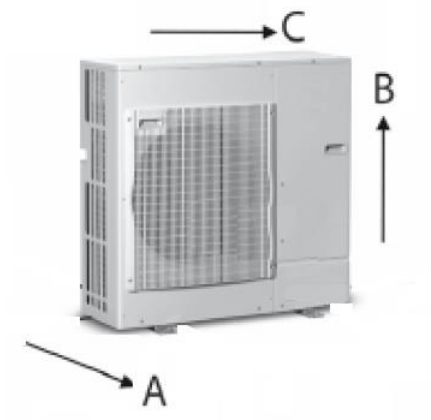
4.0 Dimensions Internal Unit. (H=910mm x W=780mm x D=300mm)



Legend

1	Refrigerant Line	16mm
2	Refrigerant Line	10mm
2.1	Electrical Inlet Route	3 Clips
3	Header Drain	½" BSP
4	Heating Flow	1" BSP
4.1	Condensate Outlet	¾" Flexible
5	Gas Inlet	½" BSP
6	Heating Return	1" BSP
7	Flue Spigot	Concentric 80/125

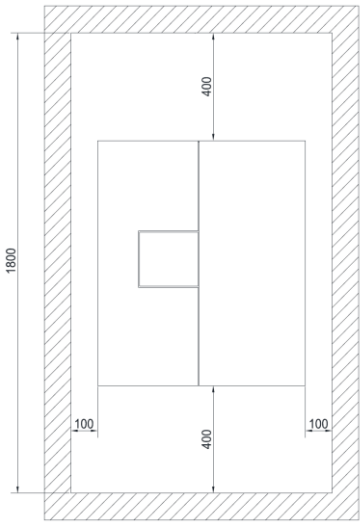
5.0 Dimensions Evaporator External Unit. **(H=943mm x W=950mm x D=330mm) (**PUHZ-SW75VHA.UK)



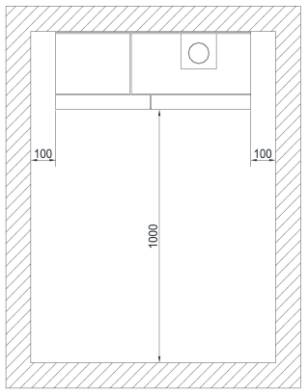
#	Dimension
A	330 mm
B	943 mm
C	950 mm
W	75 kg

6.0 Installation and Service Clearances

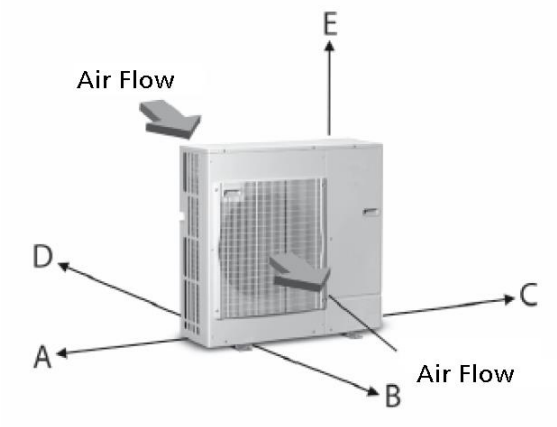
Internal Unit Front View



Internal Unit Top View



External Unit



#	Minimum Clearance
A	50mm
B	750mm
C	250mm
D	250mm
E	100mm

7.0 Delivery and Mounting

The hybrid unit is supplied on two pallets.

The cased internal hydraulic assembly and separate gas condensing boiler on one pallets and the external evaporator on the other.

Please dispose of all packaging in an environmental way.

It is advisable to remove the casing from the internal units prior to installing.

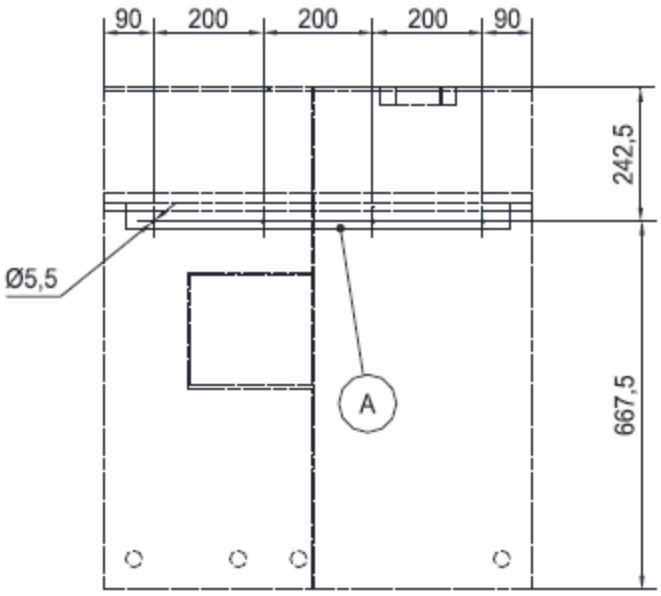
The case is secured with 2 screws. The screws are located behind the blue door.

Rotate the MHG badge to expose a finger hole.

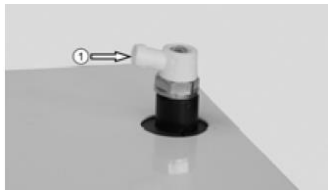
Once open the control panel and case fixing screws can be seen.

The left hand casing can be lifted clear of the unit once the screws have been removed. Followed by the interlocked right hand casing.

The hanging bracket measurements are detailed below. (A = Bracket)

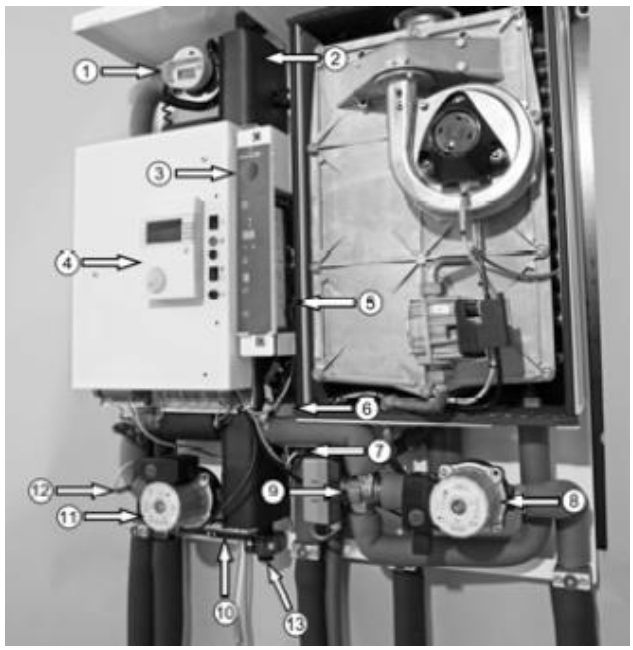


Hang the two internal units onto the wall bracket and ensure the hydraulic connections 1 are secured with washers.



Install the 3/8” vent valve and ½” drain valve as indicated.

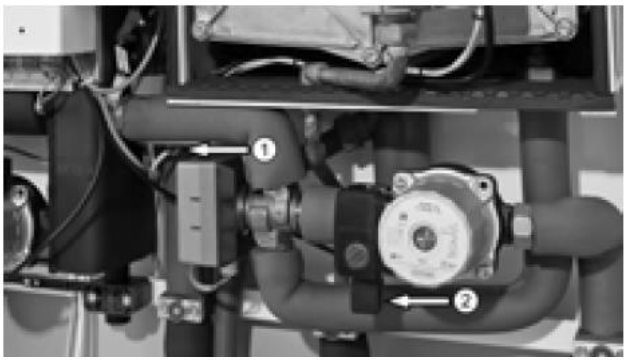
#13indicated below.



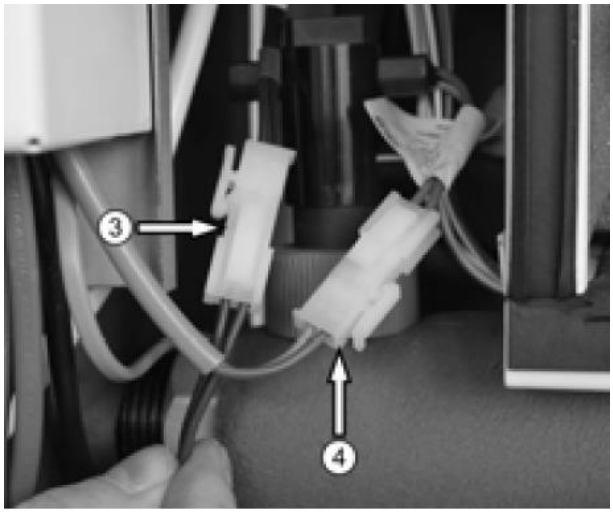
Legend

Item	Description
1	Heat Pump Heat Meter (Optional)
2	Low Loss Header
3	Boiler Control Panel
4	Controller Display
5	Boiler PCB
6	Flow Switch
7	Common Flow Sensor
8	Unit Circulating Pump (Boiler/Header)
9	3 Way Diverting Valve (Heat Pump/Boiler)
10	Cable Entry Route
11	Heat Pump Circulating Pump
12	Heat Pump Return Sensor
13	Drain Cock

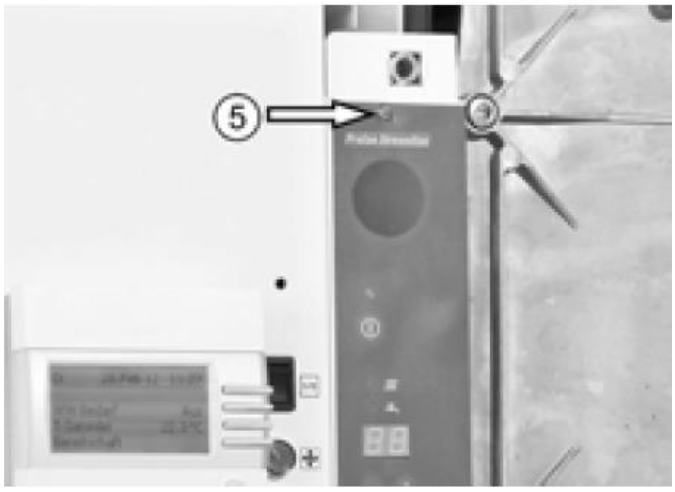
The following electrical connections must be made/checked for security.



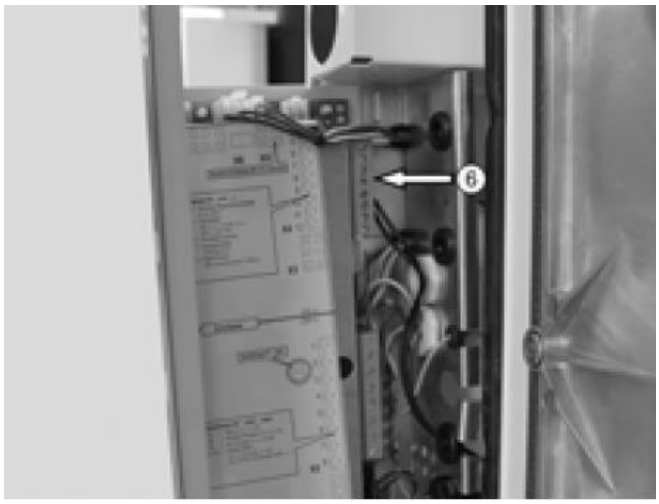
#	Description
1	Common Flow Senor F8
2	Unit Circulating Pump



#	Description
3	HWS Enable from Heat Pump Control to the Boiler
4	Flow Switch

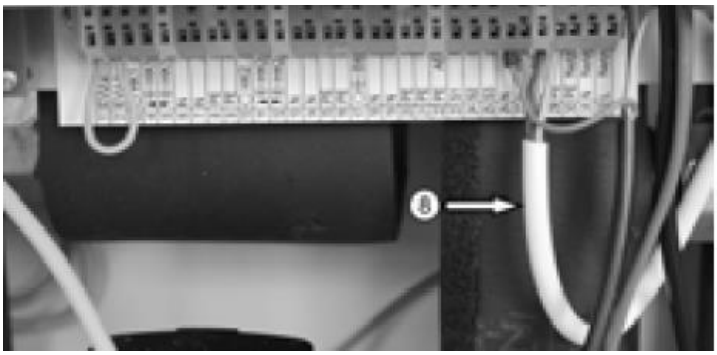


#	Description
5	Remove the Control Panel Securing screw to access the wiring Terminals for the Outside Air Sensor and RT Boiler Enable

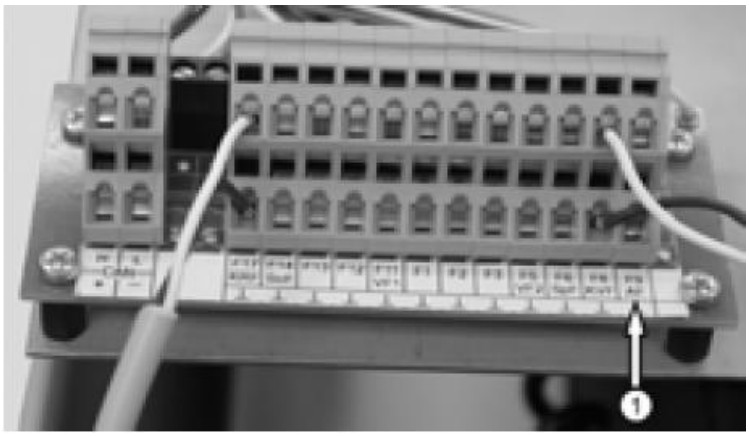


#	Description
6	Wiring Terminal X 4 RT Enable Terminals 6 & 7 Outside Air Sensor Terminals 8 & 9 (Fitted on a North or North East facing wall.)

#	Description
7	Route the RT Enable as shown. Secure the control panel with the screw



#	Description
8	Connect the boilers power supply to terminals 27, 28 & 29



#	Description
1	In addition to the boilers outside air sensor the Heat Pump module must have an outside air sensor fitted on a North or North East facing wall. Minimum CSA 1.00 mm up to 20m. 1.5mm from 21-100m Wired to F9 / M

Additional sensors can be wired to the sensor terminal rail depending upon the system design. **(Bold indicates required.)**

#	Sensor Function	Location	Voltage / Wire
41.0/F9	**Outside Air Sensor (Required)**	**North/North East Facing Wall**	**<24 Volt / 4 Core / Screened**
42.6/F8	Common Flow Sensor	Internal	<24 Volt / 2 Core / Screened
43.0/F6	**Hot Water Sensor**	**External Calorifier**	**<24 Volt / 2 Core / Screened**
40.1/F5	Heating Circuit 2 Flow Sensor	Heating System (If a 3 port valve is used.)	<24 Volt / 2 Core / Screened
44.0/F3	Thermal Store Sensor (Upper)	External Buffer (Infrequently used)	<24 Volt / 2 Core / Screened
44.2/F2	Thermal Store Sensor (Middle)	External Buffer (Infrequently used)	<24 Volt / 2 Core / Screened
44.1/F1	Thermal Store Sensor (Lower)	External Buffer (Infrequently used)	<24 Volt / 2 Core / Screened
40.0/F11	Heating Circuit 1 Flow Sensor	Heating System (If a 3 port valve is used.)	<24 Volt / 2 Core / Screened
43.1/F12	Hot Water Sensor (Lower)	Multifunctional Relay 2 (MF2)	<24 Volt / 2 Core / Screened
F/13	No Function Within Hybrid	Multifunctional Relay 3 (MF3)	
45.0/F14	Solar Collector Sensor	Optional Solar Panel (MF4)	<24 Volt / 2 Core / Screened
F15	No Function Within Hybrid	~	
42.3/F17	Heat Pump Return Senor	Internal to Unit	<24 Volt / 2 Core / Screened
CAN	Communication Ports	~	<24 Volt / 4 Core / Screened
BM	Room Unit	Heated Space	<24 Volt / 4 Core / Screened
BMT	Heat Pump Controller	Internal	<24 Volt / 4 Core / Screened

8.0 Technical Data

Gas Condensing Boiler Module

Description	Unit	
Product Number		CE-0063AR3527
Weight	Kg	64
Dimensions	mm	H 910mm x W 780mm x D 300mm
Primary Water Content	L	1.4
Heat Exchanger Construction		Copper Water Ways & Aluminum Flue Ways
Heating Flow & Return	mm	22
Gas Supply Inlet	mm	15
Flue Gas/Combustion Air	mm	80/125
Nominal Input	kW	7.2 – 27.3
Nominal Output 80/60°C	kW	7.0 – 26.2
Nominal Output 50/30°C	kW	7.7 – 26.8
Nominal Efficiency 80/60°C	%	97.2 – 96.0
Nominal Efficiency 50/30°C	%	98.2 – 106.9
Nominal Efficiency 40/30°C	%	101.0 – 108.5
Maximum Flow Temperature	°C	75
Nominal Mass Flow Rate @20 ΔT	L/h	1160
Maximum Operating Pressure	bar	3
Maximum Inlet Gas pressure	mbar	50
Minimum Inlet Gas Pressure	mbar (Nat/LPG)	18/35
Nominal Power Input	V / Hz	230/50
Installation Categories		B_{23}, B_{33}, C_{13x} , C_{33x}, C_{43x}, C_{53x}, C_{63x}, C_{83x}
Residual Flue Gas Pressure	Pa	90
Flue Gas Temperature @ 80/60°C	°C	94

9.0 Technical Data

Heat Pump Module (PUHZ-SW75VHA.UK)

System		Air/Water
Model PUHZ-SW75VHA.UK		Heat
Heat output in 7 output levels	kW	7,2 (3,1-10,5)
Range of use for heating	°C	-20 to +24
Max. flow temperature for hot water	°C	60
Max. heat output / Compressor frequency at A10/W 35	kW / Hz / COP[1)]	10,5 / 99 / 4,4
Max. heat output / Compressor frequency at A7/W35	kW / Hz / COP[1)]	10 / 96 / 4,3
Max. heat output / Compressor frequency at A2/W35	kW / Hz / COP[1)]	7,2 / 96 / 3,4
Max. heat output / Compressor frequency at A2/W35	kW / Hz / COP[1)]	5,1 / 61 / 3,9
Max. heat output / Compressor frequency at A-7/W35	kW / Hz / COP[1)]	4,8 / 99 / 2,5
Max. heat output / Compressor frequency at A-15/W35	kW / Hz / COP[1)]	3,8 / 99 / 1,9
Max. heat output / Compressor frequency at A7/W45	kW / Hz / COP[1)]	9,4 / 99 / 3,4
Max. heat output / Compressor frequency at A2/W45	kW / Hz / COP[1)]	7,0 / 96 / 2,8
Max. heat output / Compressor frequency at A-7/W45	kW / Hz / COP[1)]	5,2 / 99 / 2,2
Max. heat output / Compressor frequency at A-15/W45	kW / Hz / COP[1)]	4,3 / 116 / 1,5
Max. heat output / Compressor frequency at A20/W 55	kW / Hz / COP[1)]	10,4 / 94 / 3,0
Max. heat output / Compressor frequency at A7/W55	kW / Hz / COP[1)]	7,9 / 89 / 2,5
Max. heat output / Compressor frequency at A-7/W55	kW / Hz / COP[1)]	3,1 / 95 / 1,1
Refrigerant / Base fill	-- / kg	R 410A[2)] / 3,2
Refrigerant, Additional volume 10-50m	g/m	60
Water volume flow at Δt 5K (level 6)	m³/h	1,2
Volume flow, air (exterior unit)	m³/h	3300
Max. operating pressure water	Bar	3,0
Hydraulic connection flow/return	BSP	1“ AG
Diameter of cooling lines, liquid	mm	10
Diameter of cooling lines, gas	mm	16
Max. single length	m	50
Max. difference in elevation	m	30
Sound pressure level (for exterior unit)	dB(A)	38[3)]
Dimensions of interior unit (H x W x D)	mm	910x780x300
Dimensions of exterior unit (H x W x D)	mm	943x950x330
Weight of interior unit	kg	85
Weight of exterior unit	kg	75
Electricals internal unit		
Power supply system	V / Hz	1 NPE 230 V 50 Hz
Fuse on site, Tripping characteristic B	A	16
Electricals external unit		
Power supply system	V / Hz	1 NPE 230 V 50 Hz
Starting current max.	A	19
Operating current	A	9,74
Rated power consumption	kW	2,32
Fuse on site (exterior unit), Tripping characteristic C	A	20

10.0 Positioning the External Unit (PUHZ-SW75VHA.UK)

Please refer to the External Unit's technical manual for complete guidance.

11.0 Installing the Refrigerant Pipework

Only a suitably qualified F Gas engineer shall undertake the installation and commissioning of the refrigerant pipework between the internal and external units.

Failure to install and commission the refrigerant pipework correctly will invalidate the appliances warranty.

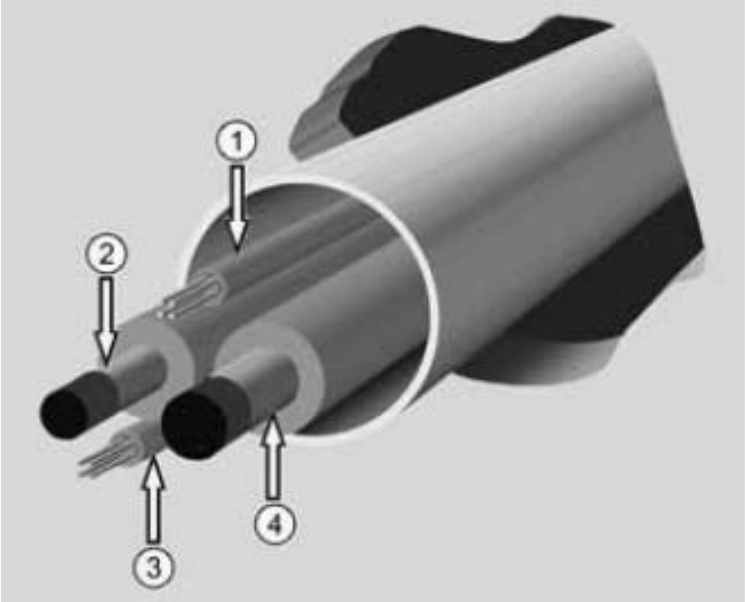
Additional guidance can be found in the External Unit's manual.

The interconnecting pipework is 10mm and 16mm.

In order to connect the refrigerant line and the electrical cables to the exterior unit the wall must be breached. The breach/hole must be a min. of Ø 70 mm and 10 mm gradient from inside to outside.

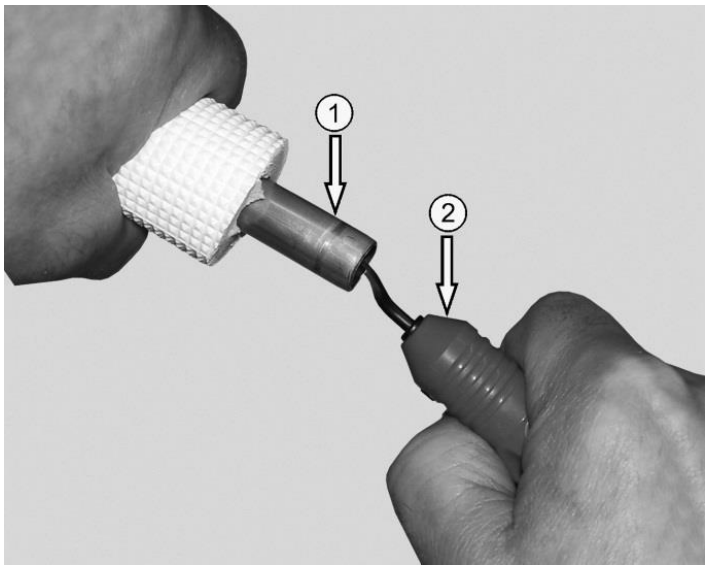
To avoid damage the breach/hole should be padded from within as detailed below and lined with a PVC pipe.

After assembly has been completed the wall breach/hole on site should be sealed with an appropriate sealing compound in accordance with fire prevention regulations. Do not use substances containing cement or lime for this purpose.



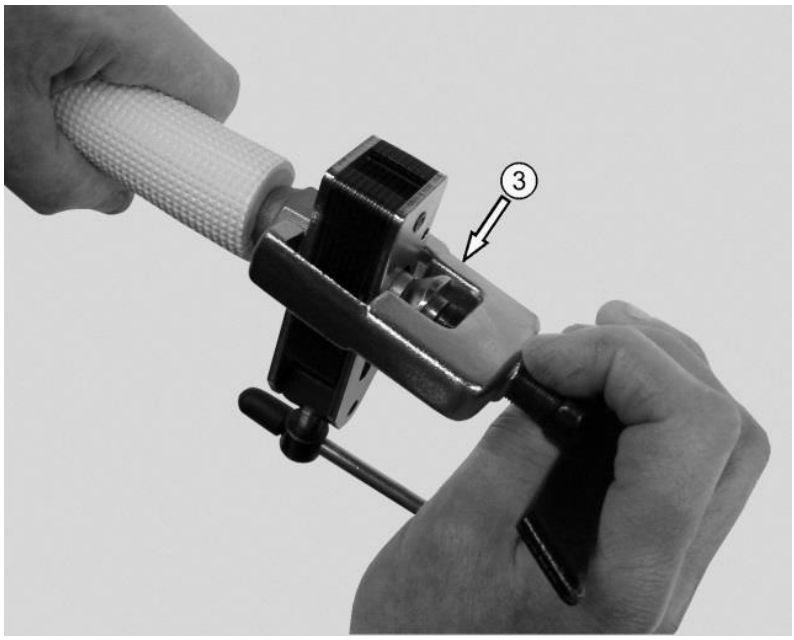
#	Description
1	Communication / Control Cable
2	10mm Refrigerant Pipe
3	Communication / Control Cable
4	16mm Refrigerant Pipe

The external unit is supplied with 3.5kg of R410A refrigerant which is sufficient for 10m (One Way) of interconnecting pipework.



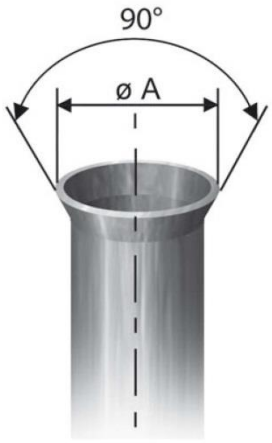
Refrigerant lines must be countersunk to avoid clipping particles

#	Description
1	Refrigerant Pipework
2	Countersink Tool



For connection to the exterior unit a flare border must be added to the copper pipe ends.

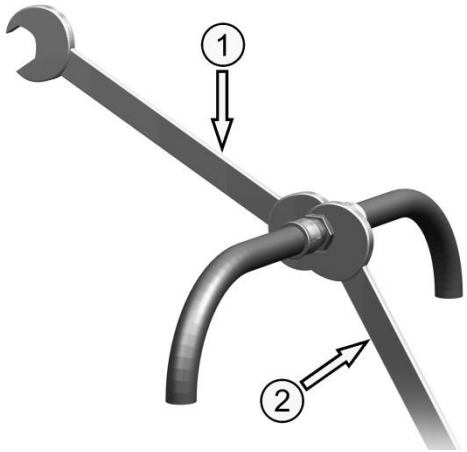
#	Description
3	Bordering Tool



Please ensure that the correct border dimensions are adhered to.

Copper Pipe External Diameter	Border Dimensions
10mm	12.8 – 13.2 mm
16mm	19.3 – 19.7 mm

Ensure that the correct tightening Torque is used.



Diameter	Tightening Torque
3/8”	32-40 Nm
5/8”	65-75 Nm

If any brazing/welding work is undertaken on the refrigerant line, a protective gas (i.e. nitrogen) will need to be passed through the pipe in order to prevent scale formation. Scale and other contamination can impair the proper operation of the device leading to premature failure which will not be covered by the unit’s warranty.

12.0 Electrical Connections

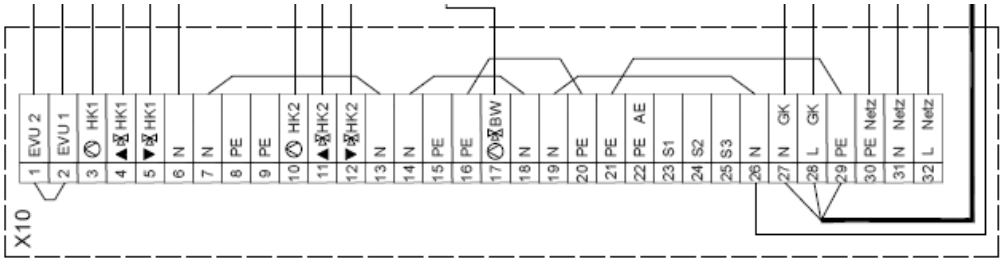
Both the internal and external units require suitably rated power supplies.

Electricals internal unit		
Power supply system	V / Hz	1 Phase 230 V 50 Hz
Fuse on site, Tripping characteristic B	A	16
Electricals external unit		
Power supply system	V / Hz	1 Phase 230 V 50 Hz
Starting current max.	A	19
Operating current	A	9,74
Rated power consumption	kW	2,32
Fuse on site (exterior unit), Tripping characteristic C	A	20

A 3 core and earth link from the internal unit to the external unit provides control and operational data feedback.

Please note that a power supply for the external unit is present within the internal unit
Please ensure that the power supplies to both the internal and external units are isolated prior to undertaking work on either unit to prevent electrical shocks.

Internal Unit Power Connections



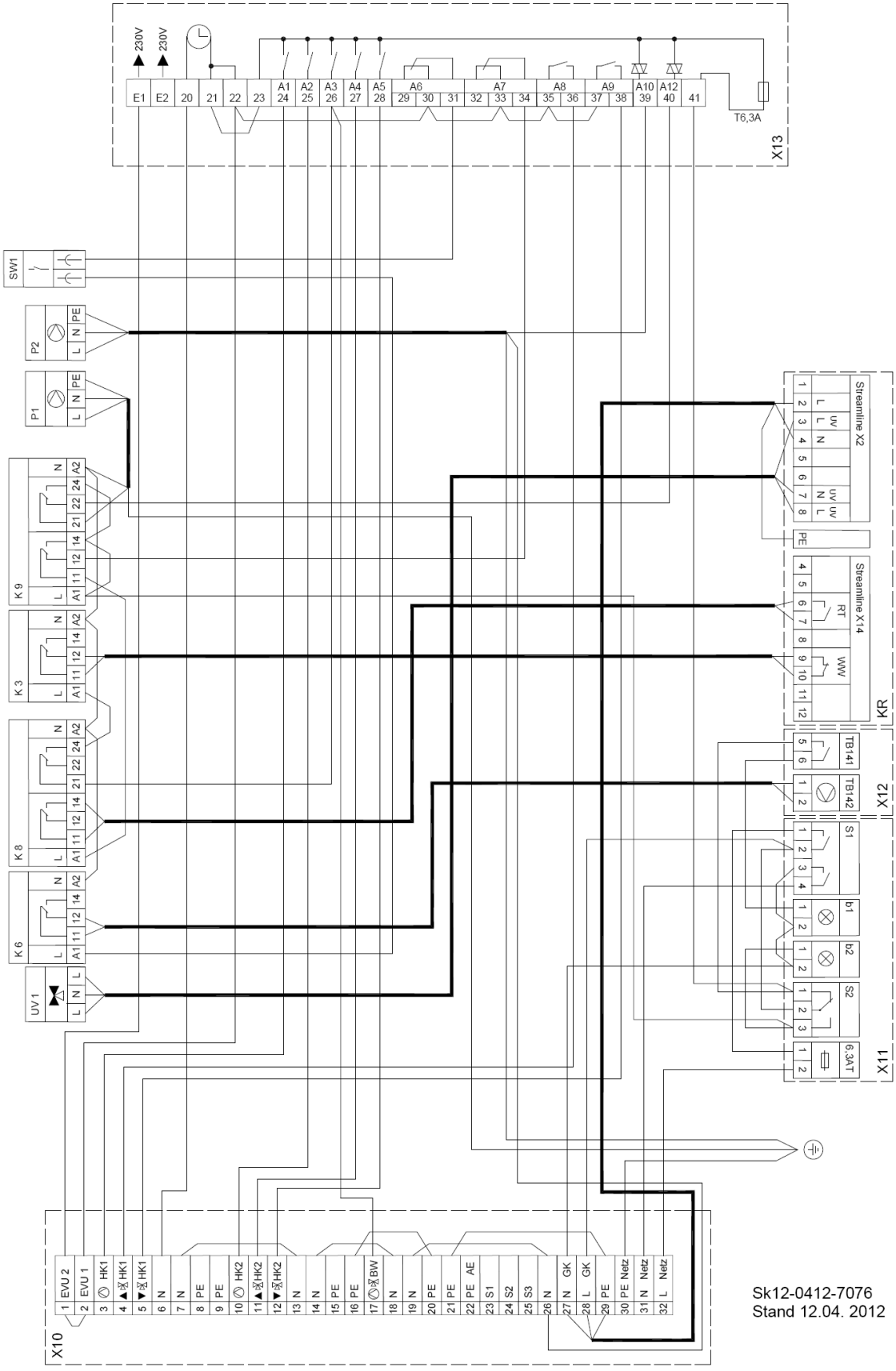
3=L, 6=N, 8=E. Output to Heating Pump	17=L, 18=N, 19=E. Output to HWS Pump	23=S1, 24=S2, 25=S3, 22=Earth Internal unit to External unit Control	32=L, 31=N, 30=E. Unit Power Supply.
3 Core 230V 1 Amp	3 Core 230V 1 Amp	3 Core + Earth 230V 5 Amp	3 Core 230V Single Phase 10 Amp Supply.

External Unit

L N E Unit Power Supply.	S1, S2, S3. Earth Internal unit to External unit Control
3 Core 230V Single Phase 25 Amp Supply.	3 Core + Earth 230V 5 Amp

Internal Wiring

Internal Wiring Diagram Heat Pump Module



Internal Wiring Diagram Heat Pump Module

Main #	Sub #	Description		Main #	Sub #	Description
		Maximum output loading 1Amp per output Total loading 6.3 amp		X12 (TB141)	5/6	Compressor
X13	A1	Relay Heating Zone 1 Pump		X12 (TB142)	1/2	Compressor
	A2	Relay Heating Zone 2 Pump		X11 (S1)	1/2	Main Power Switch L
					3 /4	Main Power Switch N
	A3	Relay Hot Water Pump		X11 (b1)	1	Compressor Operating Indicator Lamp
	A4	Relay Heating Zone 2 Mixing Valve Open			2	Indicator Lamp Neutral
	A5	Relay Heating Zone 2 Mixing Valve Close		X11 (b2)	1	Hand Mode Indicator Lamp
	A6	Relay Heat Pump Enable			2	Indicator Lamp Neutral
	A7	Relay Gas Boiler Enable		X11 (S2)	1	Automatic Operation
	A8	Relay Heating Zone 2 Mixing Valve Open			2	Live in to Hand Auto Switch
	A9	Relay Heating Zone 2 Mixing Valve Close			3	Hand Operation
	A10	Relay Heat Pump Pump		X11 (6.3AT)	1 /2	Unit Fuse 6.3 A
	A12	Relay Unit Pump		X10	1	Power Supply Company Control EU
	E1	Power Supply Company Control			2	Power Supply Company Control EU
	E2	Not Used			3	Heating Zone 1 Power Output
KR (X2)	1	Not Used			4	Heating Zone 1 Valve Open Output
	2	Power Supply to Gas Boiler L			5	Heating Zone 1 Valve Close Output
	3	Power Supply 3 Way Valve L			6/7	Common Neutral
	4	Power Supply to Gas Boiler N			8/9	Common Earth
	5/6	Not Used			10	Heating Zone 2 Power Output
	7	Power Supply 3 Way Valve N			11	Heating Zone 2 Valve Open Output
	8	Power Supply 3 Way Valve L*			12	Heating Zone 2 Valve Close Output
KR (X14)	4/5	Not Used			13/14	Common Neutral
	6/7	Heating Enable (Volt Free)			15/16	Common Earth
	8	Not Used			17	Hot Water Pump Output
	9/10	Hot Water Enable (Volt Free)			18/19	Common Neutral
	11/12	Not Used			20/21	Common Earth
					22	External Unit Earth
					23	S1 230Volt Communication to External Unit
					24	S2 Ground Communication to External Unit
					25	S3 24V Communication to External Unit
					26	Neutral For Unit Pump
					27	Neutral For Gas Condensing Boiler
					28	230 V Power Supply to Gas Condensing Boiler
					29	Earth For Gas Condensing Boiler
					30	Main Earth Input
					31	Main 230V Neutral Input
					32	Main 230V Live Input

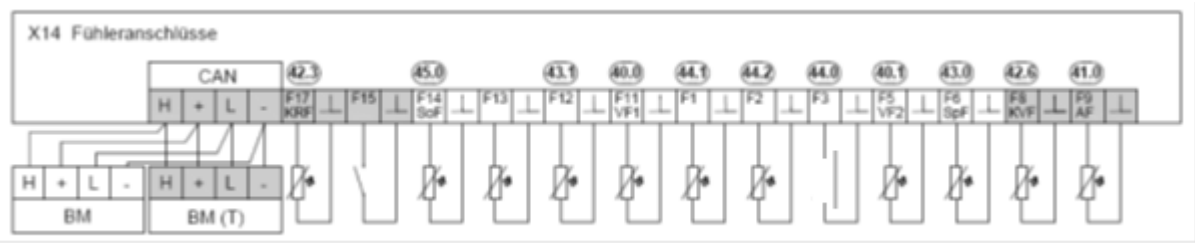
*****Permanent Live for 3 Way Valve

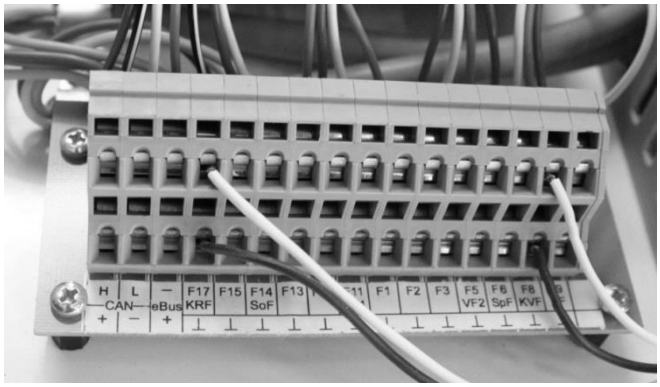
Item	Description
UV1	3 Way Valve
K6	Heat Pump Enabling Relay
K8	Boiler Enabling Relay
K3	Hot Water Control
K9	Manual Override to Enable The Gas Boiler and Pump
P1	Unit Pump
P2	Heat Pump Pump
SW1	Flow Switch

Internal Unit Sensor Terminals **(All sensor/inputs are twin core with the second core connecting to the terminal below)**

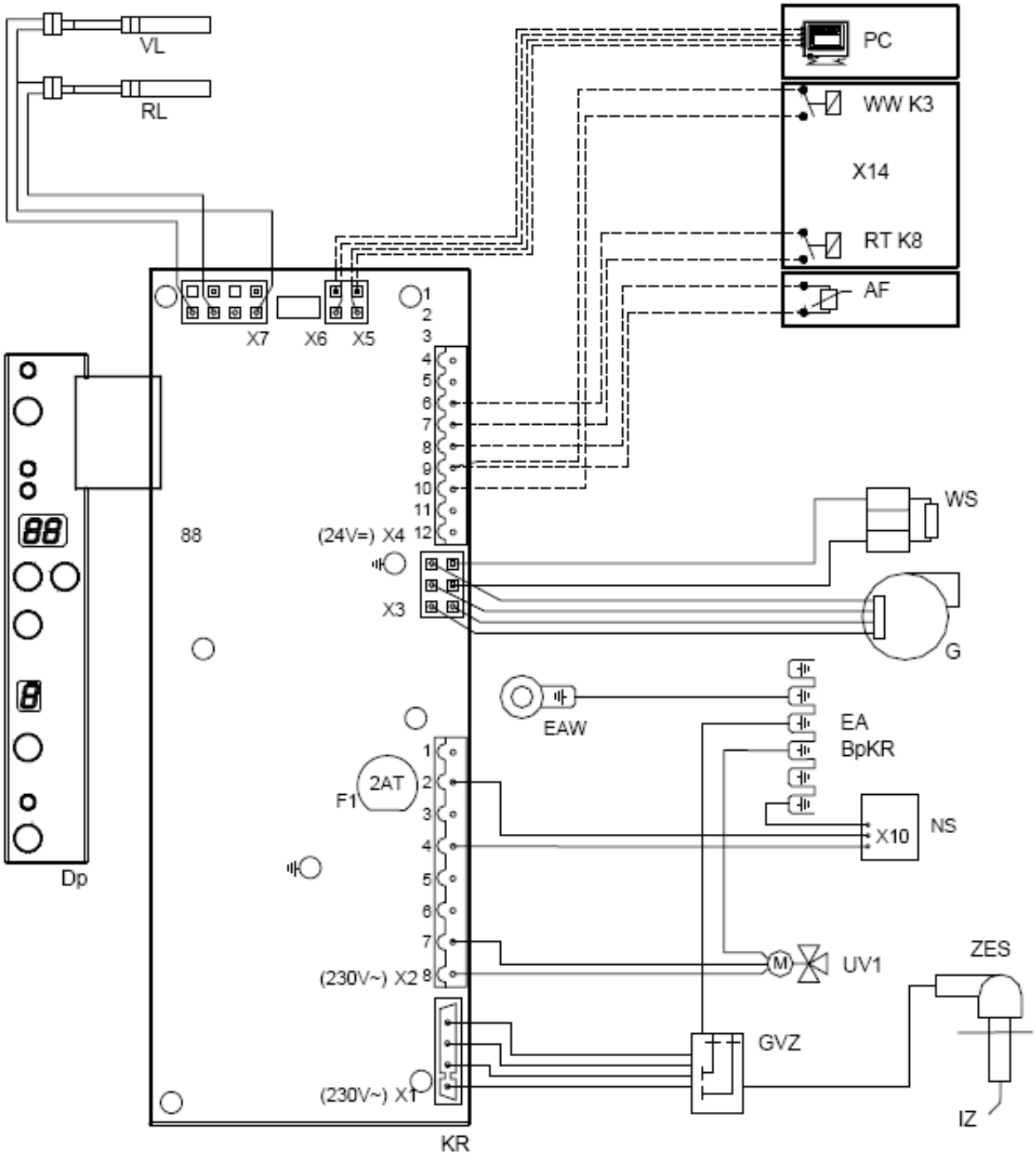
#	Sensor Function	Location	Voltage / Wire
41.0/F9/	**Outside Air Sensor (Required)**	**North/North East Facing Wall**	**<24 Volt / 4 Core / Screened**
42.6/F8	Common Flow Sensor	Internal	<24 Volt / 2 Core / Screened
43.0/F6	**Hot Water Sensor**	**External Calorifier**	**<24 Volt / 2 Core / Screened**
40.1/F5	Heating Circuit 2 Flow Sensor	Heating System (If a 3 port valve is used.)	<24 Volt / 2 Core / Screened
44.0/F3	**Volt Free Heating Enable***	**Via a Volt Free Room Unit**	<24 Volt / 2 Core / Screened
44.2/F2	Thermal Store Sensor (Middle)	External Buffer	<24 Volt / 2 Core / Screened
44.1/F1	Thermal Store Sensor (Lower)	External Buffer	<24 Volt / 2 Core / Screened
40.0/F11	Heating Circuit 1 Flow Sensor	Heating System (If a 3 port valve is used.)	<24 Volt / 2 Core / Screened
43.1/F12	Hot Water Sensor (Lower)	Multifunctional Relay 2 (MF2)	<24 Volt / 2 Core / Screened
F/13	No Function Within Hybrid	Multifunctional Relay 3 (MF3)	
45.0/F14	Solar Collector Sensor	Optional Solar Panel (MF4)	<24 Volt / 2 Core / Screened
F15	0-10 Volt Control Input	External Controller	
42.3/F17	Heat Pump Return Senor	Internal to Unit	<24 Volt / 2 Core / Screened
CAN	Communication Ports	~	<24 Volt / 4 Core / Screened
BM	Room Unit	Heated Space	<24 Volt / 4 Core / Screened
BMT	Heat Pump Controller	Internal	<24 Volt / 4 Core / Screened

*If a timed volt free enable is used, all heating time switches should be set to ON --:-- OFF --:--





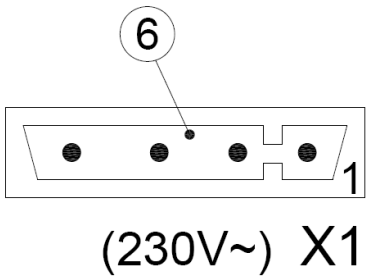
Internal Wiring Diagram Gas Condensing Boiler



Gas Condensing Boiler Internal Wiring Diagram Legend

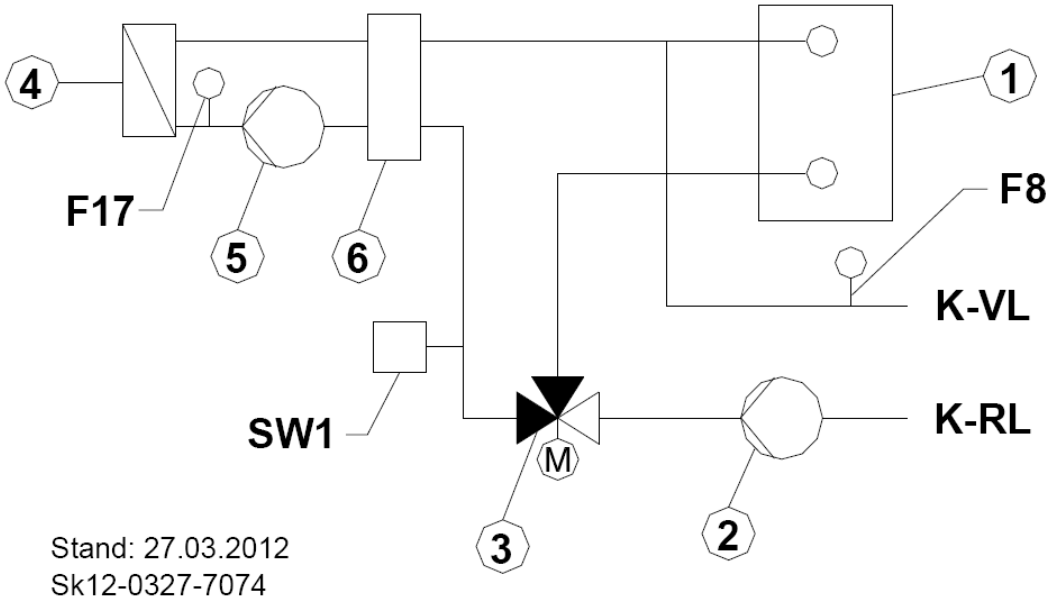
Item	Description	Associated Terminals.
AF	Outside Air Sensor	Block X4 Terminals 8 & 9
BpKR	Common Earth Rail	~
DP	Display Fascia	~
EA	Common Earth Rail	~
EAW	Combustion/Heat Exchanger Chamber Earth Connector	~
GVZ	Gas Valve & Ignition Transformer/Rectification Unit	~
G	Combustion Fan	~
IZ	Ignition / Rectification Electrode	~
KR	Controller PCB	~
NS	Power Supply	Block 2 Terminals 2 L & 4 N
PC	Notebook Interface Connection	~
RL	Return Sensor	~
RT	Boiler Enable	Block 4 Terminals 7 & 8
UV1	3 Way Valve	Block 2 Terminals 7 & 8
VL	Flow Sensor	~
WS	Resistor 220 Ohm 5W	~
DHW	HWS Relay K3	~
X1	Gas Valve and Ignition Output	230 Volt
X2	3 Way Valve and Power In	230 Volt
X3	Combustion Fan	24 Volt
X4	External Sensor Input and Boiler Enable	24 Volt
X5	PC Interface	24 Volt
X6	No Function	~
X7	Internal Sensor Input	24 Volt
X14	Relay Interface Within Heat Pump Module	230 Volt / 24 Volt
ZES	Ignition Electrode Cap 1k ohm	~

Terminal X1



Terminal	Colour	Description
1	Red	Rectification
2	Black	Live
3	Blue	Gas Valve Neutral
4	Brown	Ignition Neutral
--	Green / Yellow	Protective Earth

13.0 Internal Hydraulic Configurations

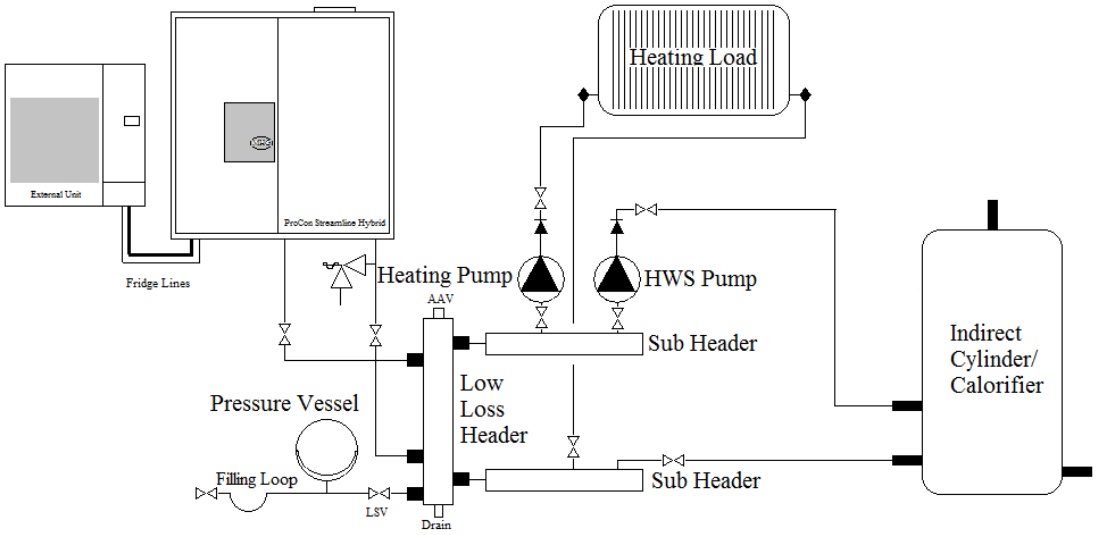


Legend

#	Description
1	Gas Condensing Boiler
2	Hybrid Pump
3	3 Way Diverting Valve
4	Heat Pump Heat Exchanger
5	Heat Pump Pump
6	Heat Pump Low Loss Header
F8	Hybrid Common Flow Senor
F17	Heat Pump Return Senor
K-VL	Hybrid Flow Pipe
K-RL	Hybrid Return Pipe
SW1	Hybrid Flow Switch

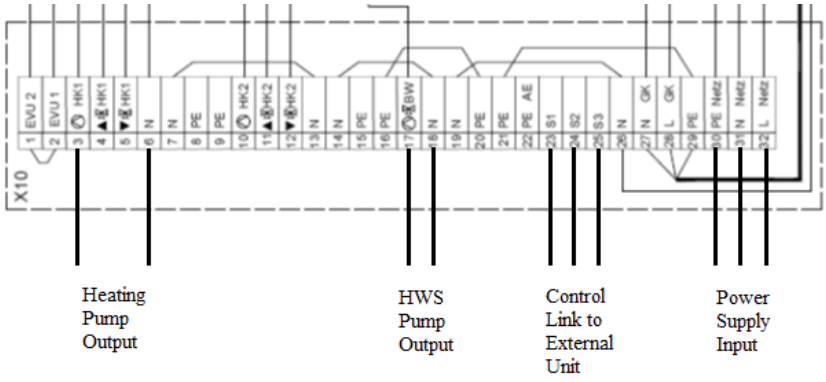
14.0 Hydraulic Configuration

Single Heating Zone system with direct on Hybrid weather compensation and priority hot water.

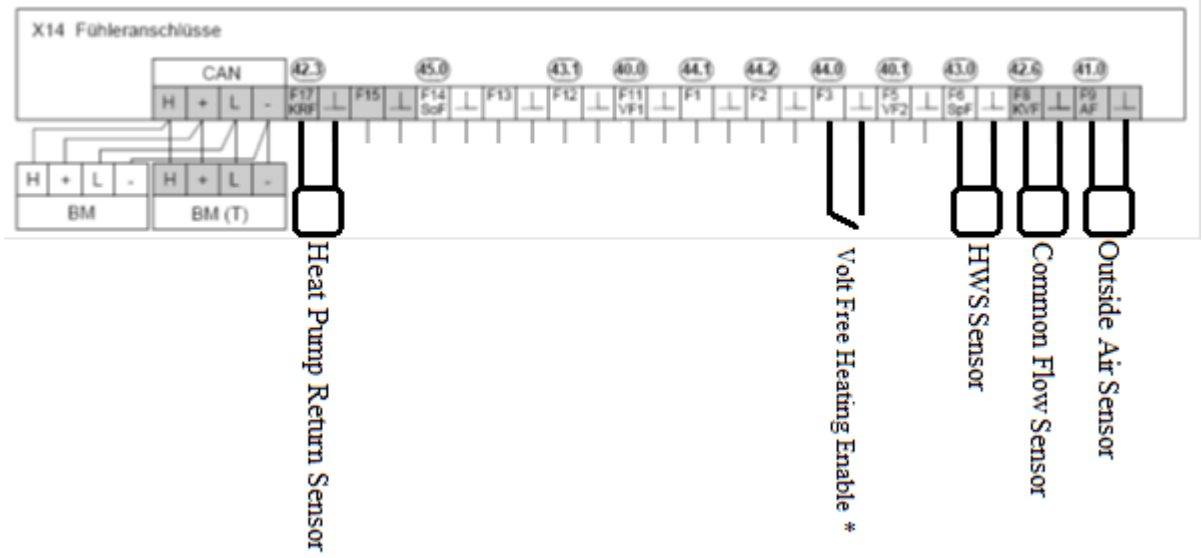


Electrical Connections

Internal Unit Power.



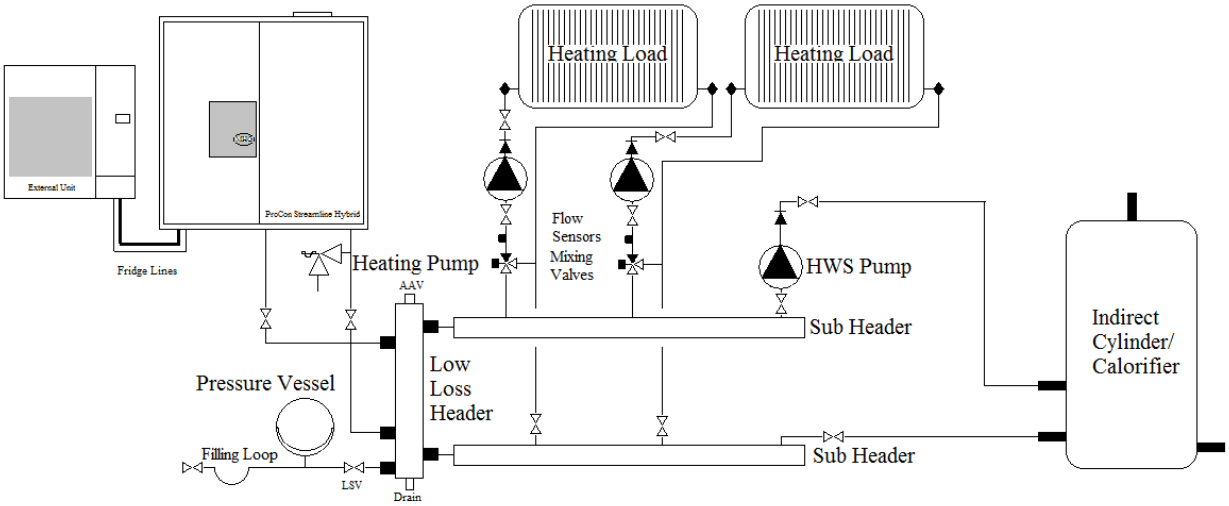
Internal Unit Sensors



*If a timed volt free enable is used, all heating time switches should be set to ON --:-- OFF --:--

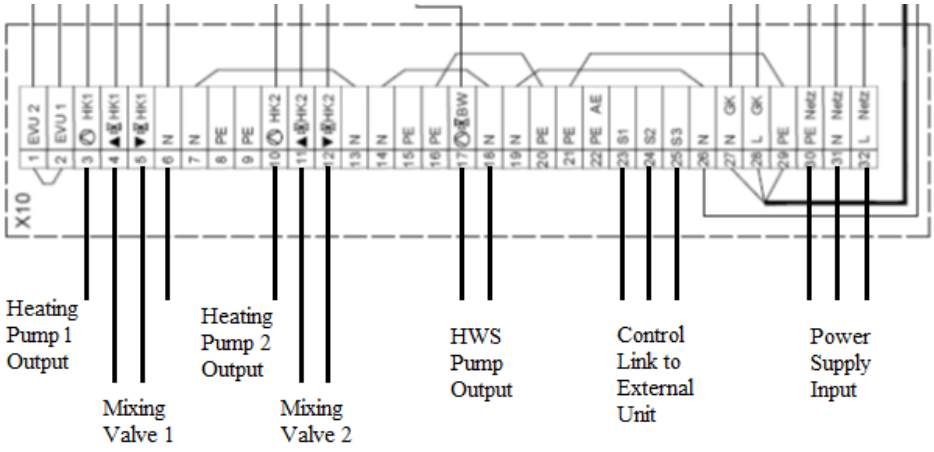
15.0 Hydraulic Configuration

Dual Heating Zone system with direct on Hybrid weather compensation and priority hot water.

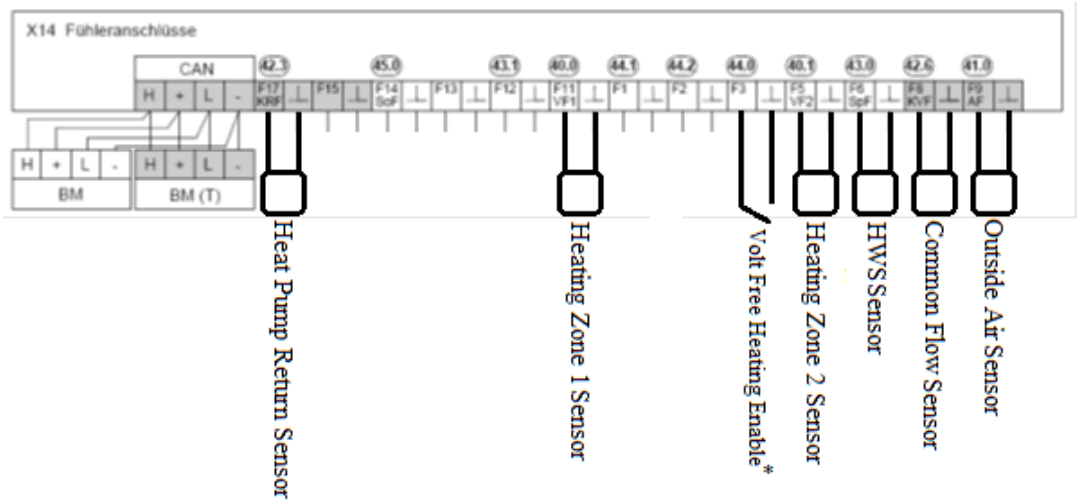


Electrical Connections

Internal Unit Power.



Internal Unit Sensors



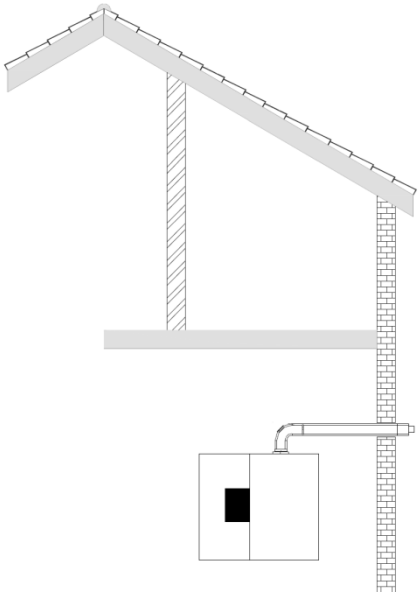
*If a timed volt free enable is used, all heating time switches should be set to ON --:-- OFF --:--

16.0 Fluing Installation Options

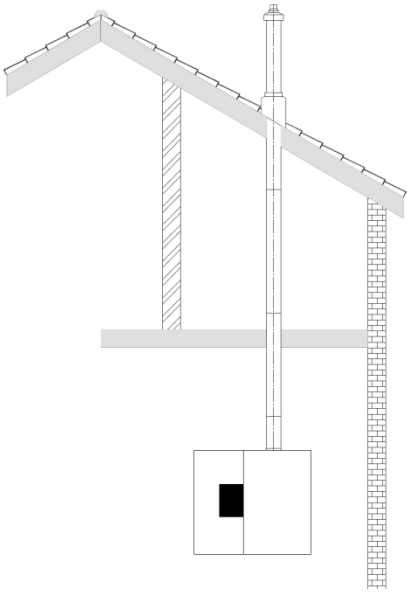
When flues are installed with horizontal sections/portions a 3^0 fall back to the boiler must be maintained. This will not only ensure condensate removal preventing premature seal failure, but also prevent nuisances dripping from the wall terminal.

Please ensure that the flue adapter is installed prior to installing any addition flue components .

Concentric Wall Terminal Configuration



Concentric Roof Terminal Configuration



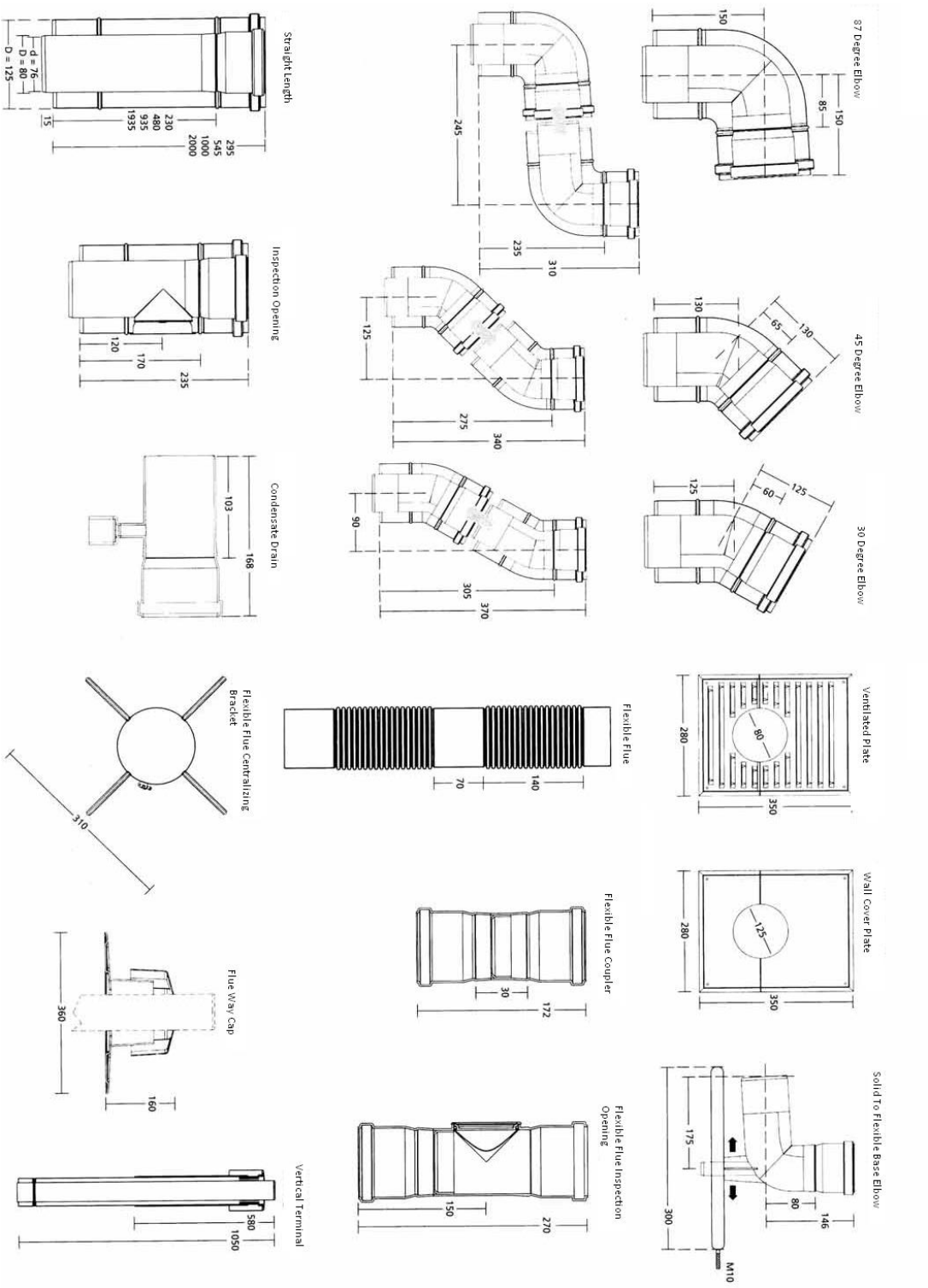
The boiler can also be installed open flued, taking air from the room. DN 80 Components are used in this configuration.

Flexible flues systems are also available with coils available up to 50M.

17.0 Fluing Options

Please note that excessive resistance within the flue and combustion air supply systems will lead to a reduction in the output of the appliance and induce operational faults.

	Hybrid
80/125mm Concentric Flue Components	(Pa Resistances)
Wall Terminal	5.0
Vertical Terminal	5.0
955mm Flue Extension	4.0
500mm Flue Extension	2.0
255mm Flue Extension	1.5
87º Bend	4.0
45º Bend	2.0
30º Bend	1.5
80mmØ PPS Flue Components	(Pa Resistances)
Exhaust Pipe Terminal	2.5
Air Pipe Terminal	4.0
955mm Flue Extension	3.0
500mm Flue Extension	1.5
255mm Flue Extension	1.0
87º Bend	3.0
45º Bend	1.5
30º Bend	1.0

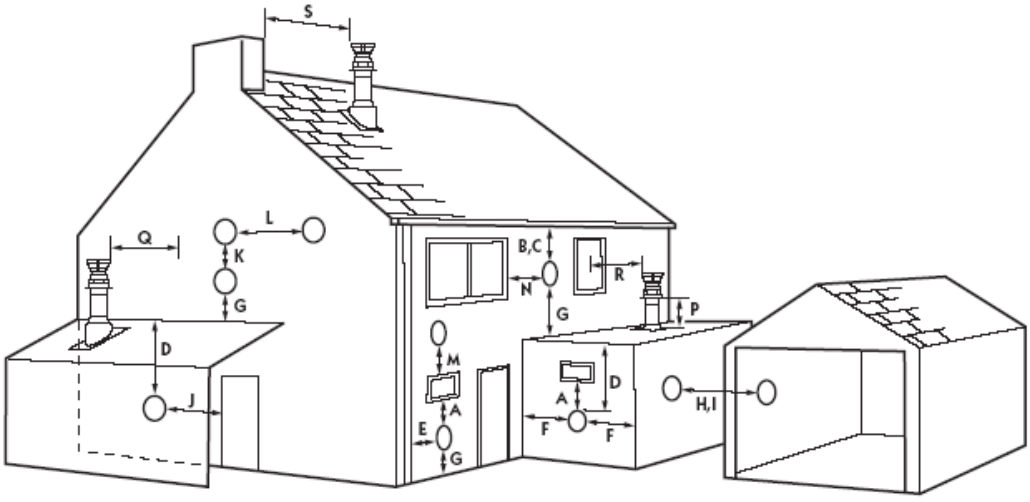

Straight Length
d = 76
D = 80
D = 125
15
1935
935
480
230
2000
1000
545
295
87 Degree Elbow
150
85
150
245
235
310
Inspection Opening
120
170
235
45 Degree Elbow
130
65
130
125
275
340
Condensate Drain
103
168
30 Degree Elbow
125
60
125
90
305
370
Flexible Flue Centralizing Bracket
310
Flexible Flue
70
140
Ventilated Plate
280
80
350
Flexible Flue Coupler
30
172
Wall Cover Plate
280
125
350
Flue Way Cap
360
160
Flexible Flue Inspection Opening
150
270
Solid To Flexible Base Elbow
175
80
146
300
M10
Vertical Terminal
580
1050

18.0 Balanced Flue Terminal Positions For Boilers Below 70kW Net Input

(All measurements are in mm and are minimum clearances.)

	Terminal Location	Boilers with a rated Input < 70kW Net
A	*Below and opening window etc.	300
B	Below gutter soil pipes etc.	75
C	Below Eaves.	200
D	*Below balconies or car port roof.	200
E	From vertical drain or soil pipe etc.	150
F	From internal or external corners.	300
G	Above ground or balcony level.	300
H	From a surface facing the terminal.	2000
I	From a terminal facing the terminal.	2000
J	*From opening in a carport into a dwelling.	1200
K	Vertically from a terminal on the same wall.	1500
L	Horizontally from a terminal on the same wall.	300
M	Above an opening, window etc.	500
N	*Horizontally to an opening, window etc.	300
P	Above a level roof (base of terminal.)	500
Q	From an adjacent wall (edge of terminal.)	500
R	From adjacent opening, window etc.	1000
S	From any other flue terminal.	600

* Positions not recommended.



Groups of appliances of 150kW gross input (136kW net input) and above must comply with the Clean Air Act with respect to the chimney discharge height.

The terminal/s shall be guarded if it is less than 2000mm above the ground or in any position where it may cause injury to persons resulting from touching a hot surface. Absolute guidance must be sought from the respective regulation.

19.0 Pressure (Safety) Relief Valve

In accordance with the prevailing British Standard 5440/6644, the installer shall install as suitably sized Pressure (Safety) Relief Valve.

The location of this valve is important with respect to the applied pressure of the units circulation pump, it is therefore recommended to locate the Pressure (Safety) Relief Valve on the return pipe immediately adjacent to the heat generator; furthermore, there must not be any means of isolation between the unit and the Pressure (Safety) Relief Valve.

To assist with the correct positioning of the pressure relief valve hydraulic connector kits are available as an optional extra.

20.0 Filling The Heating System

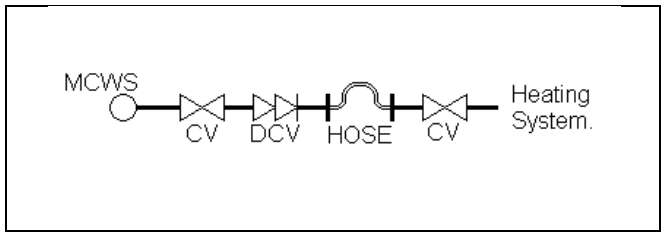
The Initial filling of a sealed heating system, and subsequent refilling, must be by a method that has been approved by the Water Regulation Advisory Scheme (WRAS) for that type of heating system.

i.e. Domestic (*In-House*) Fluid Category 3 (*C-3*)

Non Domestic (Other than *In-House*) Fluid Category 4 (*C-4*)

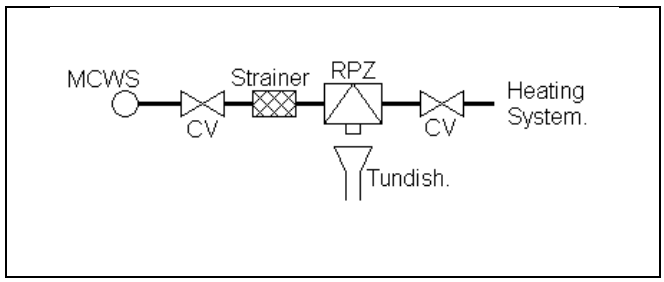
For Category 3 systems, the approved method of filling must comprise of the following components in the arrangement shown;

- Control Valve incorporating a Double Check Valve on the Mains Cold Water pipework.
- Temporary Connecting Hose, which must be disconnected after use.
- Control Valve, on the heating system.



For Category 4 systems, the approved method of filling must comprise of the following components in the arrangement shown;

- Control Valve.
- Strainer.
- Verifiable Backflow Device with Reduced Pressure Zone (RPZ Valve).
- Incorporating a 'Type BA' Air Gap.
- Tundish.
- Control Valve.



Furthermore, in accordance with BS 6644: 2005 system with an input greater than 70kW (nett), an automatic water replenishment unit shall be installed to automatically replenish any lost or evaporated water.

Please refer to BS 6644: 2005 for allowable water replenishment methods for use with sealed/pressurized heating systems.

For information on a comprehensive range of pressurization units that comply with current British Standards and WRAS Regulations, please contact MHG Heating Ltd Sales.

21.0 Expansion Vessel

In accordance with BS 6644: 2005, WRAS Regulations, and Local Authority Water Regulations, as applicable, the installer shall install a suitably sized, and approved, Expansion Vessel to ensure that the water capacity of the system has ample expansion capacity.

The location of the expansion vessel shall only be isolatable from the system via a Lockable Type Service Valve, which shall be locked in the *OPEN* position, to prevent accidental isolation.
Furthermore, a drain facility should be provided adjacent to the expansion vessel to aide the routine maintenance, overhaul, of the vessels Air Pressure setting.

For information on a comprehensive range of expansion vessels that comply with current British Standards and WRAS Regulations, please contact MHG Heating Ltd Sales.

22.0 System Water Quality

Water Treatment, System Cleaning (BS 7592: 2006)(Building Regulations Part L).

The entire primary system MUST be thoroughly cleaned and flushed to remove debris, flux residues, etc. before opening the boiler isolation valves & flooding the boiler. Particular care must be taken where the Hybrid boiler is being retro-fitted into an old/existing system, as system silt or magnetite can be very damaging to the new unit.
Following cleaning and flushing the system MUST be dosed with a good quality water treatment to prevent corrosion and the formation of scale. FAILURE TO OBSERVE THESE REQUIREMENTS WILL RENDER THE WARRANTEE ON THE APPLIANCE VOID.
Cleaning, flushing and water treatment must be carried out in accordance with the requirements of BS 7592:2006, prior to commissioning the boiler.
Repeated draining and refilling of the system, without replenishment of water treatment, must be avoided, as this is very damaging to the boiler. The boiler must not operate without the system water being correctly and adequately treated, and maintained, with an appropriate level of corrosion inhibitor.

For specific guidance on water treatment, direct contact is advisable with:-

Betz Dearborn Limited
(Sentiel)
Foundry Lane
Widnes
Cheshire
WA8 8UD
Tel: 0151 424 5351
Fax: 0151 420 5447

Alpha-Fry Technologies (Fernox)
Cookson Electronics
Forsyth Road
Sheerwater
Woking
Surrey
GU21 5RZ
Tel: 0208 665 6666
Fax: 0208 665 4695

23.0 **Appliance Controls**

Prior to activating the unit for the first time please ensure that all services, systems and sensors have been installed, checked, flushed, all pumps & valves are bled and free to operate.

A self test mode is initiated by both the internal and external units. This may take up to 10 minutes. Within this period the units will not operate.

When power is applied to the unit the controller will display END and OK.

END must be selected.

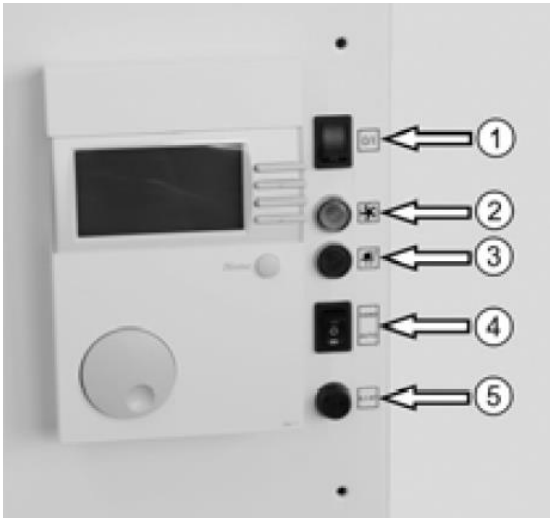
If OK is pressed the installation menu can be adjusted from the factory defaults. If alterations are made the unit may not function as designed.

If no button is pressed within 5 Seconds the screen will refresh to the standard operating mode.

The Green Lamp must stop flashing before any programing can be undertaken.

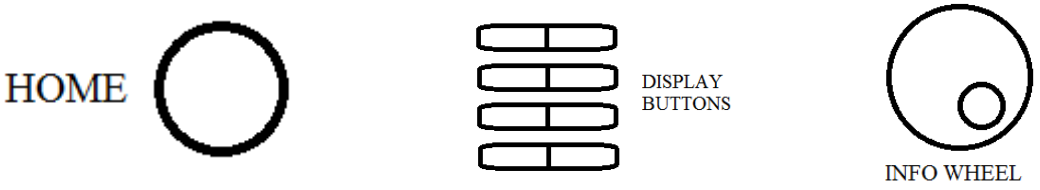
The appliances control / display panel provides access to the majority of the units control settings.

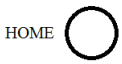
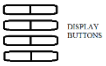
A separate control panel is mounted on the gas condensing boiler. Once commissioned this panel should not need adjusting. (Detail for this panel is provided later in this manual).



#	Description
1	Main Power Switch
2	Heat Pump Operation Indicator
3	Manual Override Button Commissioning Mode
4	Automatic / Manual Operation Switch
5	Main Fuse (6.3 Amp)

Adjustment of the controller is undertaken via the HOME BUTTON, the DISPLAY BUTTONS and the INFO WHEEL.



Controls	Function
	**Provides access to the setting parameters screen from a default screen.** **Returns the screen to a default screen from a parameter setting screen.**
	**Provides access to the second level information of the displayed value.** **Selects a value to be altered by the INFO WHEEL. Stores the new value.**
	Changes the default display when more than four lines are available. **Changes the set value within the parameter setting mode.**

Additional Controller information can be found in the Controller Manual at the rear of this manual.

24.0 Controller Defaults

The controller has been preset to allow the unit to operate and provide the optimum operating efficiency.

The operating mode of the unit can be adjusted by pressing the lower DISPLAY BUTTON, using the INFO WHEEL and pressing the lower DISPLAY BUTTON to store the setting.

If the unit fails to operate please check the operation of all associated pumps, valves, enabling circuits prior to adjusting any settings.

End user parameterization

Key sequence: Home ⇨ Controller ⇨ User

Description	Range	Default	As Left
System			
Mode of operation	Off/On	Automatic 1	
Language		English	
LCD Contrast	-20 to + 20	4	
LCD Brightness	00-30	30	
Date and Time	00:00-24:00 / 1-7		
Time Master	On / Off	On	
°C / °F	Celsius, Fahrenheit	Celsius	
Warm Water (DHW)			
1x Warm Water	Off/On	Off	
T-DHW 1 Target	10-70°C	50°C	
T-DHW 2 Target	10-70°C	50°C	
T-DHW 3 Target	10-70°C	50°C	
BoB-Value	0 K - 70 K	0 K	
Circ with DHW Prog	Off/On	Off	
Anti-legionella	Off/On	Off	

Factory parameterization (HP) heating technician

Key sequence: Home ⇨ Controller ⇨ Technician

Description	Range	Default	As Left
Heating circuit (HK) 1 / 2			
Mode of operation	Standby, Automatic 1/2, Summer, Heat, Reduced	HK 1: ----	
	Standby, Automatic 1/2, Summer, Heat, Reduced	HK 2: ----	
T-Room Target 1	5-40°C	20°C	
T-Room Target 2	5-40°C	20°C	
T-Room Target 3	5-40°C	20°C	
T-Reduced	5-40°C	18°C	
T-Absent	5-40°C	15°C	
T-Room cool	----, 20-40°C	25°C	
Min TA cool	----, 0-40°C	27°C	
T-Flow Constant Target	10-110°C	45°C	
T-Flow Constant Reduced	10-110°C	30°C	

Description	Range	Default	As Left
Heat limit day	----, -5°C to +40°C	19°C	
Heat limit night	----, -5°C to 40°C	16°C	
Heat curve	0,00-3,00 (U/F=1.1. Rads=2.5)	1.1	
Rad adaption	OFF/ON	Off	
Influence of room	00-20	0	
Adjust Room Unit	-5,0 to +5,0 K	0,0 K	
Heat optimum	Off, T-Reduced, T-Room	Off	
Max on-time	0:00-3:00 h	0:00 h	
Low Optimum	0:00-3:00 h	0:00 h	
PC Release	0000-9999	0	
Configuration			
Terminal		On	
Change code	0000-9999	3000	
Controller Address	01-16	1	
BUS-ID HK1	(00), 01-15	1	
BUS-ID HK2	(00), 01-15	2	
eBUS supply*	Off/On	Off	
System selection	----, 01-13	7	
Control type	00-06	6	
HS1 type	00-09	7	
Gradient		Off	
HS BUS	00-05	5	
HS2 type	00-22	1	
HS2 reservoir	00-03	0	
HS3 type	00-09	1	
HS4 type	00-09	0	
Buffer	00, 01, 02	0	
Cooling operation (optional)**	Off/On	Off	
F15 Function	00-08	8	
E1 Function	00-03	2	
E2 Function	00-03	0	
Sensor	1k / 5k Sensors	5k	
Heat source			
Max T-HS1	30-110°C	85°C	
Min T-HS1	10-80°C	10°C	
Min T-HS2	10-80°C	10°C	
Max T-Accumulator	30-110°C	95°C	
Min T-Accumulator	10-80°C	10°C	
Starting-load relief	10-85°C	10°C	
Min limit	00, 01, 02	0	
Hysteresis (or Hyst HS)	5-20K	5 K	
Hysteresis Time	00-30 min.	00 min.	
Change of sequence	00-800 h	00 h	
Clock inhibition	00-30 min.	00 min.	
Hysteresis burner 2	2-20 K	2 K	

Description	Range	Default	As Left
Gradient	On/Off	Off	
Max lowering	1-20 K	10 K	
Dynamic switch-off	0,5-10 K/min.	2 K/min	
HS Cool-Factor	Off/On	Off	
T-WE start cool	30-120°C	95°C	
Cascade			
HS found		Display	
Power / step			
HS1 step1	00-9950 KW	10	
HS1 Step2	00-9950 KW	---	
HS2 Step1	00-9950 KW	25	
HS2 Step2	00-9950 KW	---	
HS3 Step1	00-9950 KW	---	
HS3 Step2	00-9950 KW	---	
HS4 Step1	00-9950 KW	---	
HS4 Step2	00-9950 KW	---	
BUS Scan	On/Off	Off	
min Mod cascade	00-100%	0	
DHW-HS		0	
Error signal	K	Display	
Power nominal	0-100%	Display	
Switching value	(-99) - 0 - (99)	Display	
Remainder blocking time	Rest [min]	Display	
Max T-HS	50-110°C	90°C	
HS-Dynamic On	20-500 K	250 K	
HS-Dynamic Off	20-500 K	75 K	
Adjust time	5-500	50	
Modgrad On	50-100%	100%	
Modgrad Off	10-60%	95%	
Min Modgrad	0-60%	0%	
Modgrad DHW	40-100%	100%	
HS sequence 1	-	1,2,3,4	
HS sequence 2	-	4,3,2,1	
Sequence mode	WE sequence 1, WE sequence 2, periodic, 1/2 interchange, rotating, sorting	1	
Sequence change	0-800 h	0 h	
Cycle lock	00-30 min.	0 min.	
Buffer			
Load T-Buffer	40-90°C / OFF / Requirement	Requirement	
T-PU night-load	0-90°C	Off	
Min T-B Puffer	10-90°C	10°C	
Heat Pumps (HP)			
Max T-RL HP	30-110°C	60°C	
Min T-RL HP	10-20°C	12°C	
Max TO HS	-20°C to +40°C	0°C	
Min TO HS	-30°C to +10°C	0°C	

Description	Range	Default	As Left
F15 Function*	00-08	8	
E1 Function*	00-03	2	
E2 Function*	00-03	0	
RL Offset	0-15 K	5 K	
Min T-DHW HS	0-90°C	51°C	
Min T-PU HS	0-90°C	10°C	
Max HS off-time	----, 10-210 min.	Off	
Cooling operation(optional)**			
T-RL cool	5-25°C	18°C	
Cooling off at DHW	00-01 (OFF, ON)	1	
Cooling with HP	00-01 (OFF, ON)	1	
0-10V I/O			
SPG curve	00-11	11	
curve 11-U1	0,00-10,00 V	1,80 V	
curve 11-U2	0,00-10,00 V	10 V	
curve 11-T1	00-120°C	10°C	
curve 11-T2	00-120°C	100°C	
curve 11-UA	0,00-10,00 V	1 V	
Floor			
Floor	Off/On	Off	
Floor program	See Explanation!	Standard	
Warm water (DHW)			
Load pump locking	Off/On	Off	
PPL	Teilvorr DHW, Ein, Aus, PPL Alle	Aus	
T-HS DHW	00-50 K	10 K	
Hysteresis DHW	5-30 K	5 K	
DHW Trail	00-30 min.	0 min.	
TH Input	Off/On	Off	
Thermfct	Off/On	Off	
Fully load	Off/On	Off	
Heating circuit (HK) I/II			
HC Function	Standard, T-Prov const, Pool, DHW, Return	Standard	
Pump Operation	Standard, Heat limits, Time program only, Non stop operation	Standard	
Mixer On (not for DHW-circuit)	5-25	18	
Mixer On (not for DHW-circuit)	5-25	12	
Max T-Flow	10-110°C	85°C	
Min T-Flow	10-110°C	10°C	
T-VL cool (optional)**	OFF, CLOSED, 10-25°C	18°C	
T-Antifreeze	----; -15°C to +5°C	3°C	
T- External Verz	0:00-24:00	00:00	
Curve dist	0-50 K	0 K	
Force decline	Off/On	Off	

Description	Range	Default	As Left
Solar/MF1-4			
MF1 Function	00-34	0	
T-MF1- Target	10-90°C	-	
MF1 Hyst	2-10 K	-	
MF1 Hyst Off	2-10 K	-	
MF2 Function	00-34	0	
T-MF2 Target	10-90°C	-	
MF2 Hyst	2-10 K	-	
MF2 Hyst Off	2-10 K	-	
MF3 Function	00-34	5	
T-MF3 Target	10-90°C	-	
MF3 Hyst	2-10 K	-	
MF3 Hyst Off	2-10 K	-	
MF4 Function	00-34	1	
T-MF4 Target	10-90°C	-	
MF4 Hyst	2-10 K	-	
MF4 Hyst Off	2-10 K	-	
Max T-Solar	80-180°C	125°C	
Min T-Solar On	-20°C to +95°C	15°C	
Min T-Solar Aus Off	-20°C to +95°C	10°C	
T-Solar Protection	80-180°C	125°C	
Return-cool diff	0 K - 30 K	0 K	
Max T-Reservoir DHW	10-130°C	60°C	
Max T-Reservoir PU	10-130°C	85°C	
Max T-Reservoir 3	10-130°C	30°C	
Solar kick-duration	0-59 sec.	0 sec.	
Solar kick-pause	10-60 min.	60 min.	
Solar kick-gradient	01-05 min.	01 min.	

25.0 Appliance Fault Codes (Heat Pump Controller)

Error	Error description
E 54	Fault in heat pump. External Unit Not Functioning / Switched Off. If the external unit is malfunctioning the PCB mounted RED and GREEN LED will provide fault data. Please use the label located on the door of the external unit or the manual attached to the end this manual.
E 81	EEPROM error. Controller Setting Error. The invalid value has been replaced with the default value ⚠ Check parameter values!
Communication error	
E 90	Addr. 0 and 1 on bus. Bus IDs 0 and 1 may not be used simultaneously.
E 91	Bus ID used. The set bus ID is already in use by another device.
E 200 – E207	Communication HS1 – HS7 (cascade)
E 220 – E235	Communication BM 0 – BM 15
E 240	Communication Manager
E 241	Communication HS (individual HS)
E 242	Communication Mixer
E 243	Communication Solar
Sensor defective (break/short circuit)	
E 69	F5: Flow sensor HC2
E 70	F11: Flow sensor HC1, sensor multifunction1
E 71	F1: Buffer storage tank low sensor
E 72	F3: Buffer storage tank top sensor
E 75	F9: Outdoor sensor
E 76	F6: Storage tank sensor
E 78	F8: Boiler sensor / Collector sensor (cascade)
E 80	Room sensor HC1, F2: Buffer middle sensor
E 83	Room sensor HC2, F15: Pool sensor (storage tank 3)
E 84	Fault in humidity sensor
E 135	F12: HW Storage tank low sensor, Multifunction 2
E 136	F13 (PT1000): HS2, Solar Panel 2, Multifunction 3
E 137	F14 (PT1000): Solar Panel 1, Multifunction 4
E 140	F17 Return flow sensor total (heat pumps/cooling)

26.0 Appliance Fault Codes (Boiler Controller)

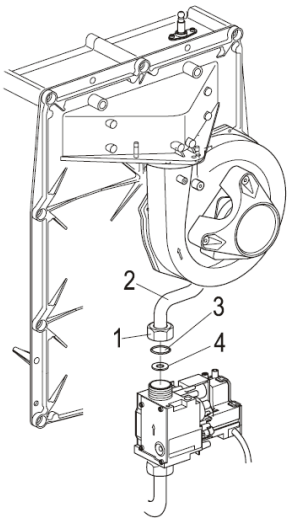
If the boiler encounters an operation fault a code will be displayed on the boiler's control panel.

Please note the fault code prior to resetting boiler.

Pressing the Reset button for 5 seconds resets the unit.

Fault Code Display D	Fault Code Display E	Description	Cause / Remedy
1		Flow Sensor S1 Fault	Check sensor and wiring
2		Return Sensor S2 Fault	Check sensor and wiring
3		Not Used	Not Used
	0	General Sensor Fault After Self Check	Check wiring, replace sensors
	1	Temperature Too High	Air in system, Strainer blocked, Pump failure.
	2	S1 or S2 Requires Replacing	Check wiring, replace sensors
	4	No Flame Signal After 4 Ignition Attempts	Gas supply Off, Gas pressure too low, Gas Valve Faulty, Gas valve out of adjustment, ignition electrode /cable fault, Condensate drain blocked.
	5	Flame Out 4 Restarts	Gas pressure too low, Gas valve out of adjustment, ignition electrode /cable fault, Condensate drain blocked.
	6	Flame Detected When Fan Off	Ignition electrode /cable fault, Controller fault.
	7	Computer Connected to Controller	Reset Unit
	8	Fan Speed Incorrect	Fan fault, Fan wiring fault,
	F or h	Internal Controller Fault	Reset Unit, Earthing fault

27.0 Fuel Gas Conversion Procedure



Conversion of the gas setting ring

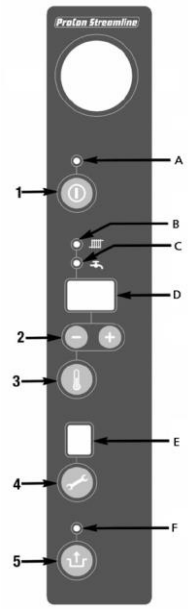
1. Switch off the electrical supply to the appliance.
2. Close the gas tap.
3. Remove the front cover of the appliance.
4. Disconnect the coupling (1) above the gas valve and turn the gas mixing pipe (2) backwards.
5. Replace the O-ring (3) and the gas setting ring (4) by the rings of the conversion set.
6. Reassemble in reverse order.
7. Open the gas tap.
8. Check the gas connections for tightness/ leaks.
9. Switch on the electrical supply to the appliance.
10. Change the parameters d and F to the values given in the table below.
11. Now check the setting of the gas/air ratio. (See below)
12. Attach a sticker of the set gas type over the existing sticker on the gas mixing pipe (2).
13. Apply a sticker of the set gas type at the appliance plate.
14. Refit the appliances case.

28.0 Boiler Controls

The boiler utilized within the ProCon Streamline Hybrid is the ProCon Streamline.

The boiler is enabled via the Hybrids controller, however the boiler is equipped with its own controller which must be set to provide the correct flow temperature for the system requirements.

All settings are made via the boilers control panel.



#	Description / Function
1	Power Mode Selector
2	Parameter Adjustment Selectors
3	Temperature Set Point Selector
4	Commissioning Mode Selector
5	Boiler Reset / Setting Store Selector
A	Power Indicator LED
B	Heating Mode Output Set Point Indicator LED
C	HWS Mode Output Set Point Indicator LED
D	Boiler Flow Set Point Temperature
E	Operating Mode Indication Display
F	Reset Required Indicator

29.0 Controller Adjustment

The control panel can be used to set or review the operation parameters of the boiler. A number of the buttons have dual/multiple functions dependent to the sequence of operation or function mode the unit is in.

1 / A Power Mode Selector/Indicator.
Pressing the button once will change to operating mode of the boiler.
If the LED is Red and the display is indicating -- the boiler is OFF and will not respond to an enabling signal.
If the LED is Green and the display is blank the boiler is ON and will respond to an enabling signal.

2 / 3 / B / C / D Boiler Flow Temperature Adjustment for Heating and HWS Operation.
Pressing button 3 will illuminate the heating mode LED B and display the respective target flow temperature on the display D. This can be adjusted via the + & - buttons 2. The setting can be stored by pressing the Reset Button 5.
Pressing button 3 twice will illuminate the HWS mode LED C and display the respective target flow temperature on the display D. This can be adjusted via the + & - buttons 2. The setting can be stored by pressing the Reset Button 5.

4 / E / 2 Commissioning Mode Selection
The commissioning mode can be activated by pressing the following buttons in the required sequence.

Required Function	Buttons	Display
Low Fire	Service Button 4 & Minus Temperature Button 2	L
Hire Fire Heating Mode	Service Button 4 & Plus Temperature Button 2	h
Highest Firing Mode	Service Button 4 & Plus Temperature Button 2 Twice	H
Exit Commissioning Mode	Minus Temperature Button 2& Plus Temperature Button 2	Normal Control

These operating mode must be used when commissioning the appliance and following any service interventions.

5 / F Reset / Storage Button
If the unit fails to operate correctly and the unit Locks-Out the F LED will be illuminated, a fault code will be displayed on E and the Reset button must be pressed for up to 5 Seconds to reset the boiler. Prior to resetting the boiler the fault code displayed on E should be noted.

Second Level Access and Alteration

A second level of operational parameters can be accessed and altered if required to suit the installation.

The second level is accessed as follows.

Switch Off the boiler by pressing button 1 so that the display E indicates -.

Press Service 4 and Reset 5 buttons simultaneously until the display E indicates – and the display D indicates 0.
Press the + button to change the Display D to 15. Press the Service 4 button to accept the password.

Access to the second level is now available.

Pressing the Service 4 buttons provides access to the different functions. The + & - buttons are used to alter the function. The Reset 5 button is used to store the altered functions.

Function	Setting	Required Setting	Description
0	Access Code	15	Second Level Access Code
1	System Type	3	
2	CH Pump Continuous	0	0 = Pump Overrun Only 1 = Pump Continuous 2 = CH Pump Continuously Active with External MIT Switch
3	Set CH Power %	70	CH Output
4	Set Max Power	80	HWS Output
5	Weather Comp Curve Min Flow Temp.	25	Max Outside Air Temp For Min CH Flow Temp
6	Weather Comp Curve Outside Air Max Flow Temp.	-1	Min Outside Air Temp For Max CH Flow Temp
7	Weather Comp Curve Outside Air Max Temp.	25	Max Outside Air Temp for CH Operation
8	CH Pump Over-run Time	1	0 -15 Minutes
9	CH Pump Over-run Time HWS Mode	1	0 – 15 Minutes
A	Rest Position of 3 way valve or 2 Port Valve Present	0	0 = Confirmed During CH Operation 1 = Confirmed During HWS Operation
C	Step Modulation	0	0 = Step Modulation Off During CH Operation 1 = Step Modulation On During CH Operation
d	Minimum Output	30	25%-40% Nat Gas 40% LPG
E	Min Flow Temp Requested by Open-Therm Controller	40	Requested Flow Temp Below Which the Boiler Will Not Operate
F	Ignition Speed % of Max	70	40 – 99%
H	Max Fan Speed	45	40 = 4000rpm 50 = 5000rpm

30.0 Commissioning The Appliance

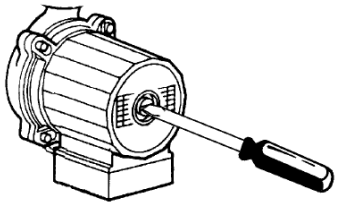
We recommend that the unit is commissioned by a MHG engineer to maximize operational efficiency and longevity.

The refrigerant system must be commissioned in line with the guidance provided in the External Units technical manual.

31.0 Pre-Commissioning Checks

Prior to undertaking the commissioning of the unit please ensure that the system water has been cleansed and treated with a suitable inhibitor as detailed in Filling the system and system water quality.

Prior to applying power to the appliance its circulation pumps should be bled and checked to ensure free rotation of the armature.



32.0 Combustion System Commissioning

A flue gas analyser must be used to ensure that the correct combustion settings are achieved.

The appliance must be placed in the commissioning mode to check and set the combustion at Maximum and Minimum outputs.

This is achieved as follows.

Locate the flue gas sampling point on the flue adapter mounted directly above the boiler.

The commissioning mode can be activated by pressing the following buttons in the required sequence.

Required Function	Buttons	Display
Low Fire	Service Button 4 & Minus Temperature Button 2	L
Hire Fire Heating Mode	Service Button 4 & Plus Temperature Button 2	h
Highest Firing Mode	Service Button 4 & Plus Temperature Button 2 Twice	H
Exit Commissioning Mode	Minus Temperature Button 2& Plus Temperature Button 2	Normal Control

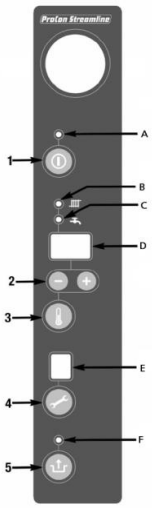
Insert your flue gas analyser in the sampling point and note the readings for the low and high outputs.

The High fire setting should always be set prior to adjusting the Low fire.

Adjust the unit to operate at High fire and adjust the gas valve B to obtain the correct CO_2%.

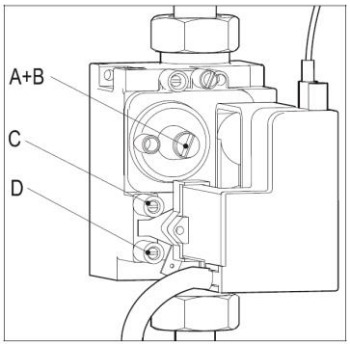
Adjust the unit to operate at Low fire and adjust the gas valve B to obtain the correct CO_2%.

Following the successful adjustment of both High and Low fire setting the boiler should be allowed to pass through one ignition cycle prior to the settings being rechecked.



Gas Valve Adjustments

A = Dust Cap, B = High & Low Fire Adjustment, C = Off-Set pressure point, D = Inlet pressure point.



Required combustion settings

Setting	Natural Gas (H) (G20)	LPG (P) (G31)
Low Fire CO_2%	8.9	9.9
High Fire CO_2%	9.1	10.3
Minimum Inlet Dynamic Gas Pressure Mbar	18	29
Outlet Restrictor Diameter mm	7.05	5.35
Minimum Fan Speed (Parameter d)	25	40
Minimum Ignition Speed (Parameter F)	70	50

33.0 Routine Inspection and Servicing

As with all appliances, we would highly recommended that a competent heating engineer services the Hybrid unit, at least every 12 months. This is assuming a normal daily usage of 8 – 10 hours.
If however the unit is to be operated 24 hours a day, 7 days, we would recommend services every 6 months.

If the Installer/Commissioning Engineer is unable to undertake the Routine Service Inspection, as detailed in the following section for the boiler and the respective section of the installed external evaporator manual, please contact the MHG Technical Department, who will be able to arrange the Routine Service Inspection to be undertaken.

34.0 Routine Service Inspection

Before commencing any service/maintenance work, the following tasks must be undertaken.

a) Ask the end user about any problems with the operation of the unit and note their comments.
b) Check the water pressure of the installation.
c) Remove the units casing and visually inspect all pipe and water joints for signs of leakage.
d) Inspect the appliance for signs of water leakage or ingress.
e) Run the Heat Pump section of the Hybrid. Visually inspect the external unit.
f) Run the unit in Commissioning Mode HIGH FIRE; with the use of a flue gas analyzer record the CO_2 level.
g) Run the unit in Commissioning Mode LOW FIRE; with the use of a flue gas analyzer record the CO_2 level.
h) Listen to the sound of the combustion fan.
i) Undertake a System Water Analysis to check the concentration level of the Water Treatment, and note the level onto the Service Report.
j) Check the flue route including the terminal position for conformity with prevailing regulations, and trim back any foliage that may be around the terminal.
k) Check the plant room/compartment ventilation system for conformity with prevailing regulations.
l) Check the Pressure (Safety) Relief Valve size, rating and orientation, for conformity with prevailing regulations.

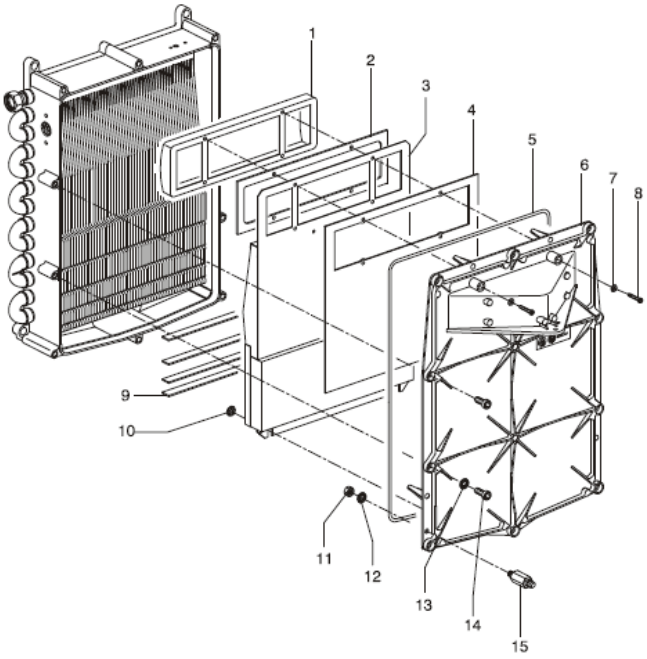
The results of the Inspections undertaken above must be acted upon, and all discrepancies should be recorded on the Service Report and brought to the Client / End User's attention.
Undertake any maintenance, and if necessary any preventative maintenance, that's required.

35.0 Routine Cleaning & Maintenance (Boiler Module)

As part of the Routine Service Inspection, certain areas of the boiler need to the checked and cleaned as necessary.

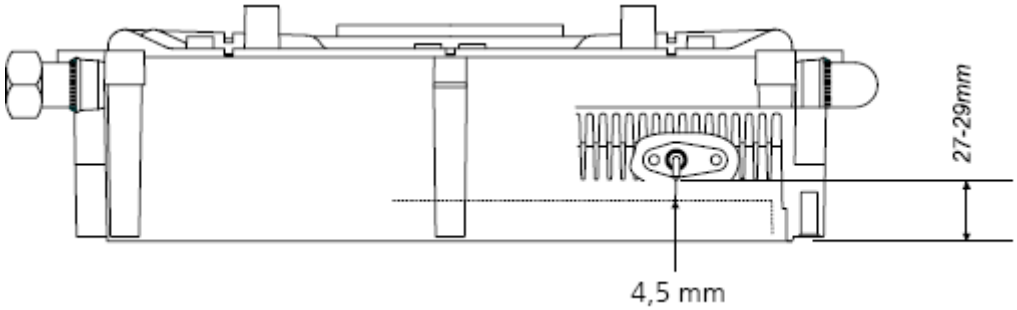
a) Turn the boiler OFF at the ON/OFF switch and electrically isolate the boiler by removing the plug or fuse from the boiler supply.
b) Turn off the fuel supply at the boiler isolation tap, fitted by the installer, adjacent to the appliance.
c) Remove the electrical connections from the boiler.
d) Remove the burner plate from the boiler.
e) Inspect the burner and clean with compressed air as required. Do not brush the burner. Ensure that the compressed air does not damage the burner surface.
f) Brush the heat exchanger with a suitable soft bristled brush.
g) Adjust the ignition electrode as indicated in the image below.
h) Flush the heat exchanger with water.
i) Open the condensate trap and clean.
j) Refit the condensate trap and refill with water via the heat exchanger.
k) Refit the burner plate assembly.
l) Ensure that all electrical connections are correctly and securely connected.
m) Inspect all water joints. Any joints found to be leaking MUST be replaced. It is also advisable when replacing water joints to also change any adjacent joints at the same time.
n) Inspect all fuel joints with a suitable leak detection method. Any joints found to be leaking MUST be replaced. It is also advisable when replacing joints to also change any adjacent joints at the same time.
o) With the use of a suitable Flue Gas Analyser, check and adjust the combustion settings.
p) Inspect the general condition of the flue system, including the termination, repair as necessary or advice on any remedial action as required.
q) Following the satisfactory completion of the above service procedure complete the required paperwork and leave the boiler as found if possible.

Burner Plate Removal



Ignition Electrode Adjustment

With the burner assembly removed set the ignition electrode to 27-29mm from the edge of the casing. This will ensure that the gap will be 4.5 mm when the burner assembly is refitted.



36.0 Routine Cleaning & Maintenance (Heat Pump)

Please refer to the annual service data for the external unit provided in the specific manual at the rear of this manual.

37.0 Fault Codes. (Gas Boiler Module)

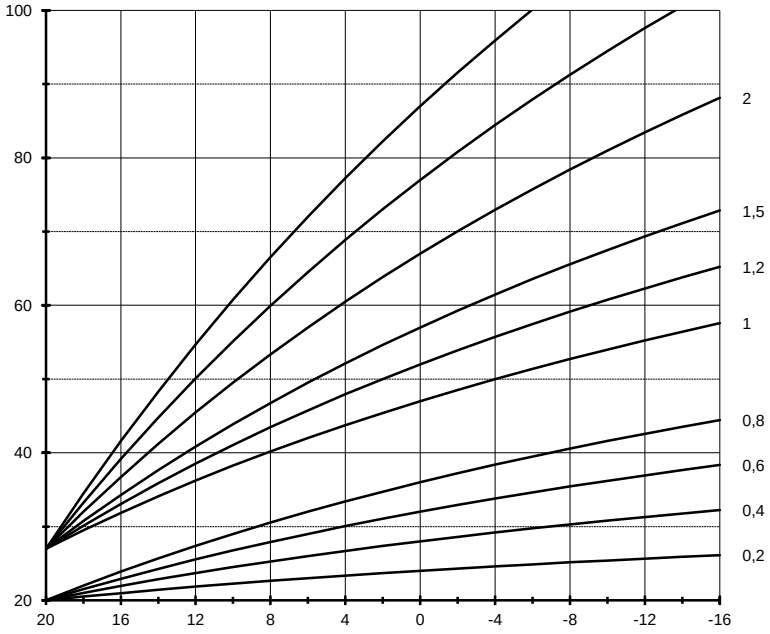
If the boiler encounters an operation fault a code will be displayed on the boiler s control panel.

Please note the fault code prior to resetting boiler.

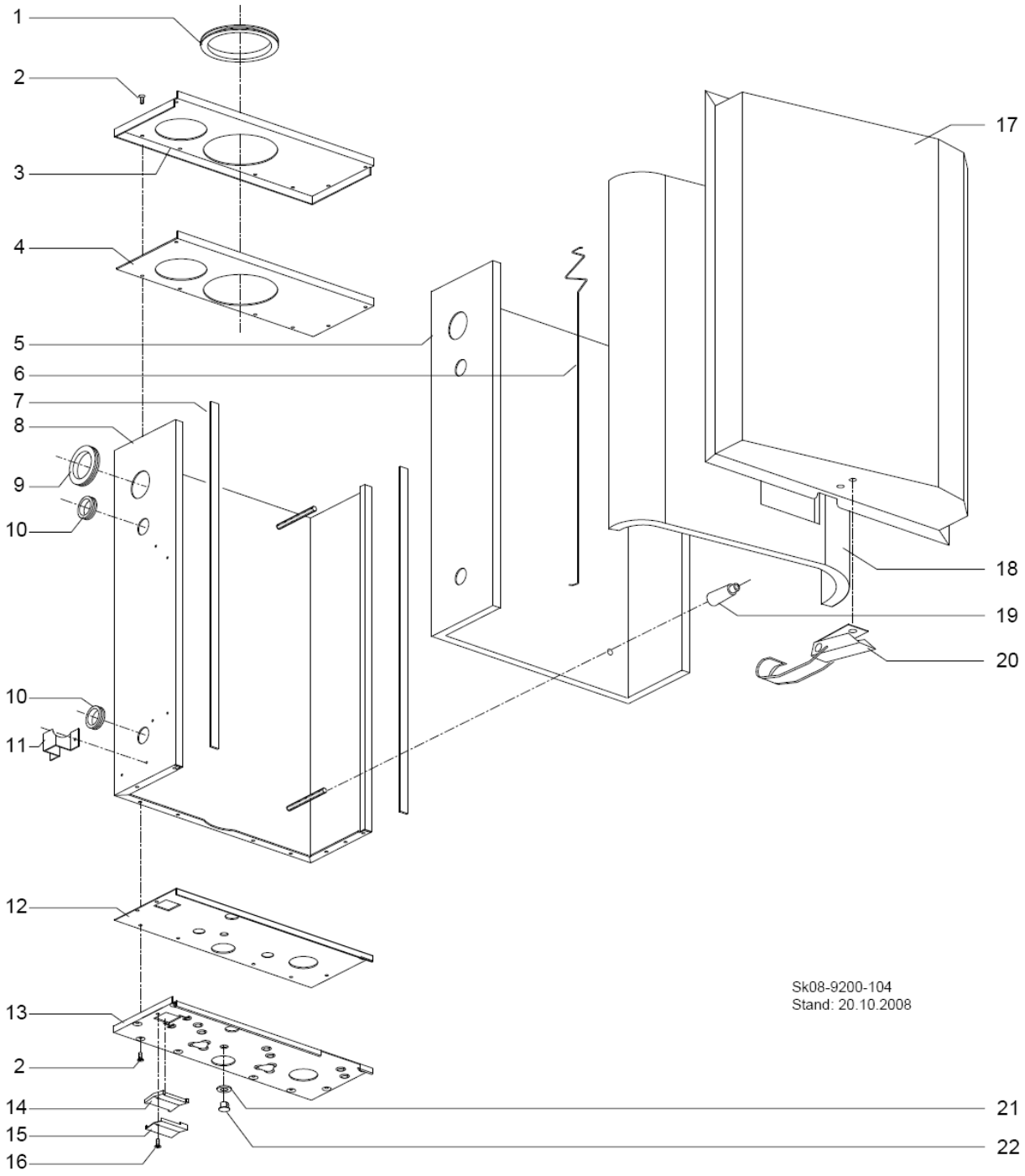
Pressing the Reset button for 5 seconds resets the unit.

Fault Code Display D	Fault Code Display E	Description	Cause / Remedy
1		Flow Sensor S1 Fault	Check sensor and wiring
2		Return Sensor S2 Fault	Check sensor and wiring
3		Not Used	Not Used
	0	General Sensor Fault After Self Check	Check wiring, replace sensors
	1	Temperature Too High	Air in system, Strainer blocked, Pump failure.
	2	S1 or S2 Requires Replacing	Check wiring, replace sensors
	4	No Flame Signal After 4 Ignition Attempts	Gas supply Off, Gas pressure too low, Gas Valve Faulty, Gas valve out of adjustment, ignition electrode /cable fault, Condensate drain blocked.
	5	Flame Out 4 Restarts	Gas pressure too low, Gas valve out of adjustment, ignition electrode /cable fault, Condensate drain blocked.
	6	Flame Detected When Fan Off	Ignition electrode /cable fault, Controller fault.
	7	Computer Connected to Controller	Reset Unit
	8	Fan Speed Incorrect	Fan fault, Fan wiring fault,
	F or h	Internal Controller Fault	Reset Unit, Earthing fault

38.0 <u>Weather Compensation Slope</u>



39.0 Exploded Spares Diagram (Gas Boiler Module)



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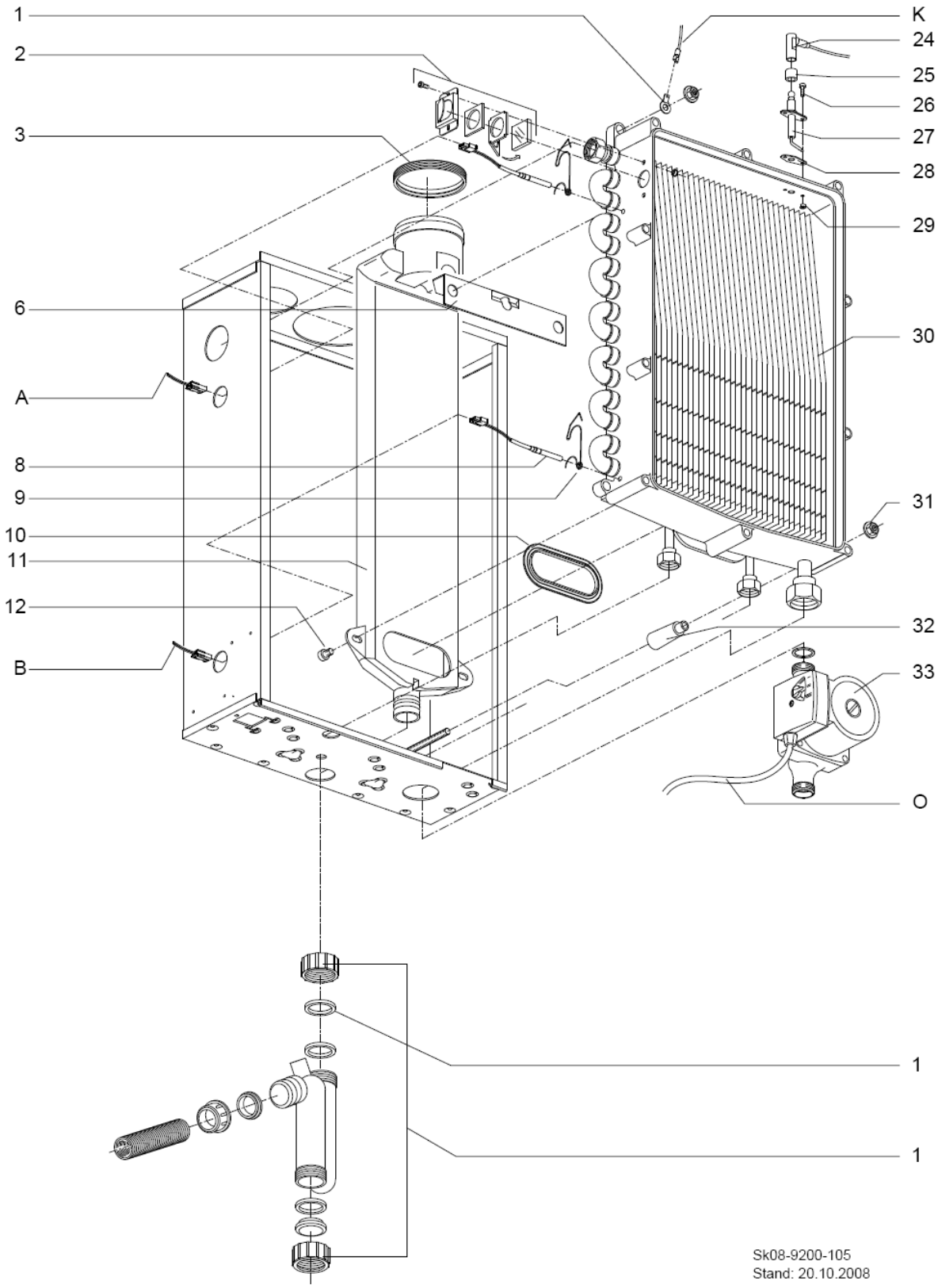
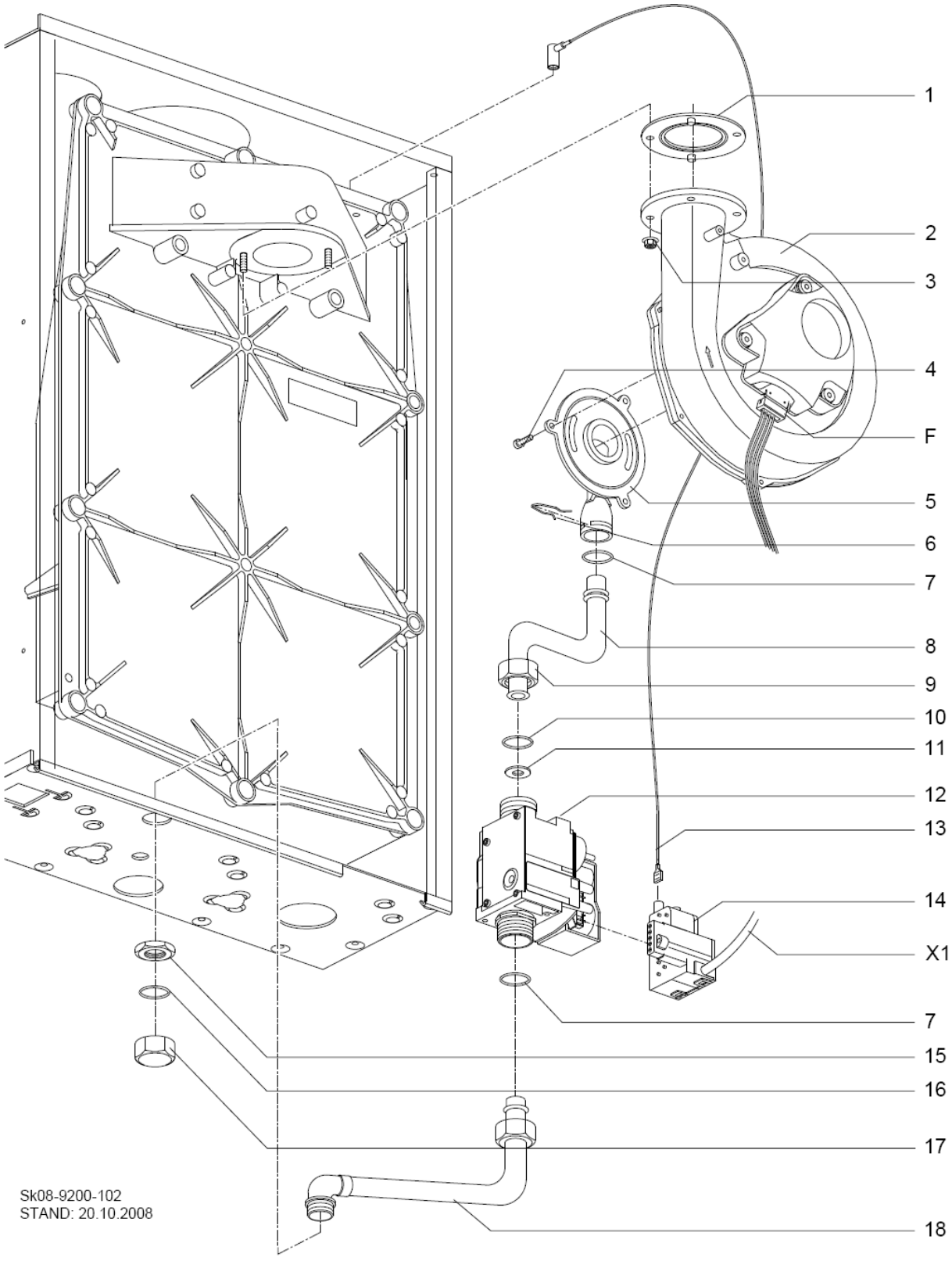


Unit 4 Epsom Downs Metro Centre, Waterfield, Tadworth, Surrey, KT20 5LR
Telephone 08456 448802 Fax 08456 448803 Email info@mhgheating.co.uk Web DHWw.mhgheating.co.uk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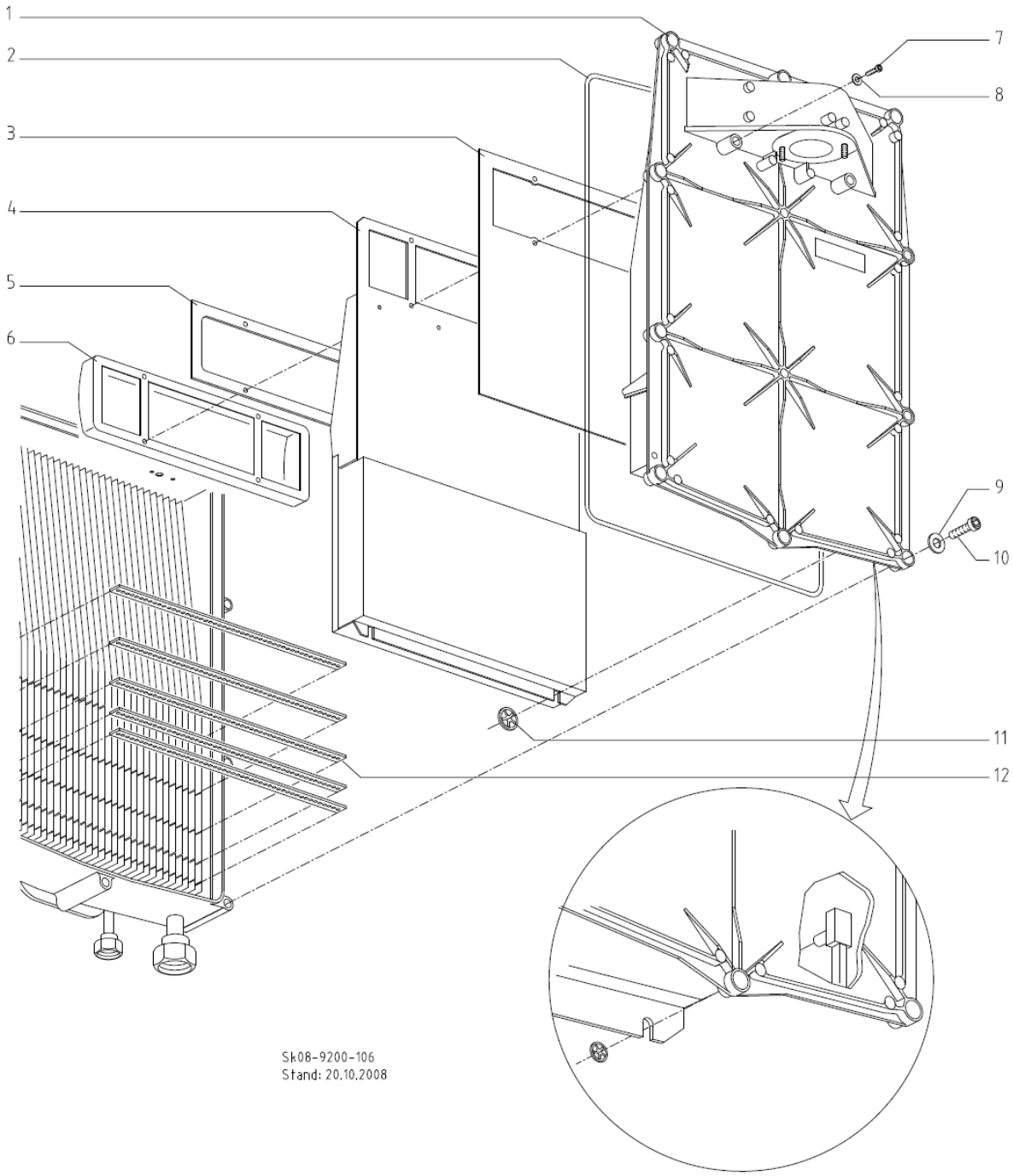
STAND: 20.10.2008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Sk08-9200-106
Stand: 20.10.2008

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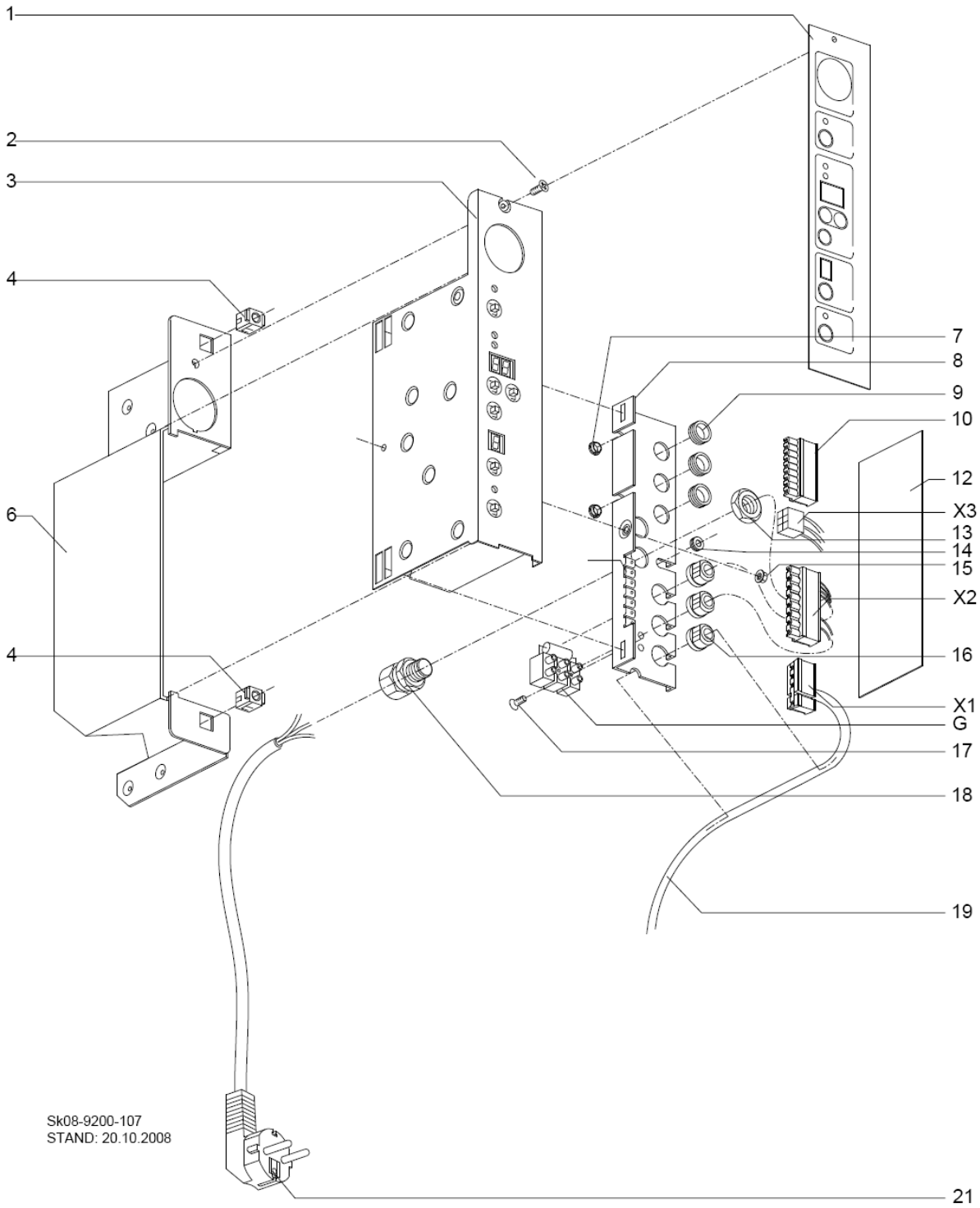

Unit 4 Epsom Downs Metro Centre, Waterfield, Tadworth, Surrey, KT20 5LR
Telephone 08456 448802 Fax 08456 448803 Email info@mhgheating.co.uk Web DHWw.mhgheating.co.uk

Internal heat pump exploded diagram to follow.

Please refer to the external unit manual at the rear of this manual for the respective exploded diagram

40.0 Parts List

Please quote the respective bubble and page number when requesting replacement components.

Notes